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CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.



"EVERY man's proper mansion-house, and home, being the theater of his hospitality, the seat of self-fruit, the comfortableness part of his own life, the noblest of his sonne's inheritance, a kind of private principedom, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

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"ALWAYS be ready to speak your mind, and a base man will avoid you."—WILLIAM BLAKE.

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THE

# INDEX TO VOLUME I

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NOTES AND REVIEWS

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## Waterworks Engineering.



WATER is not only an essential element for actual existence, but enters so into the economy of daily life, in the preparation of food and in the preservation of health, in agricultural operations and in manufactures—in fact, it is so indispensable a factor in all domestic and industrial concerns, to say nothing of the charm it imparts to the landscape, and its important contribution towards physical recreation—it is no wonder that a study of its various properties, of the laws by which it is governed, as well as its management for all purposes, should have attracted so large a share of attention amongst scientific and practical men from the earliest times. The authors of the treatise under the title of "Waterworks Engineering" deal mainly with one branch of the subject, and have therefore confined their attention to such particulars as are connected with the supply of water for domestic uses, only incidentally touching on those questions which would be included under the more general title of Water

engineering. While ostensibly professing to deal only with "Principles," the authors at the same time extend their investigations into the methods and the results obtained in actual practice; indeed, had they not done so, their treatise would have had to be classed with many other publications, excellent as far as theoretical instruction is concerned, but of comparatively little assistance and use to the engineer, who has not only to design his projects but to carry them into execution.

Experiments on the laws which govern the flow of water have been mainly conducted on so small a scale and with an absence of many of those conditions which obtain from variation of climate, temperature, soil, effects of wind, storms, peculiarity of situation and surroundings, that though interesting and accurate in themselves they are nevertheless misleading when their results have to be applied under other conditions, especially where the collection, storage, conveyance, and distribution have to be conducted on a large scale. Of course, the theory and practice of engineering must go together; it is not safe for theory to override practice, nor can the latter be independent of the former; neither does it always follow that the purely theoretical expert is the fittest to be selected for the designer of a project. An excellent illustration in point of this fact was once made by an eminent engineer in reference to one who was a good mathe-

matician, to this effect, that though he could calculate to the last drop how much water a given reservoir could hold, he was unable to lead a drop of water into it!

"*Ἀπὸ τοῦ μὲν ὕδωρ*" is true of water as man's best friend, but it is equally true that it can be a formidable foe, as those who have had to deal with controlling it under difficult circumstances can feelingly testify. A knowledge, therefore, of the nature and properties of the element itself, as well as of the materials and appliances necessary for its control, is essential to ensure correctness of design and safety in construction. The separate elements into which the subject is divided in the treatise are systematically and conveniently arranged and illustrated. Commencing at the fountain-head or source of supply, the student is conducted through the several operations until the water is delivered literally into the hands of the consumers, very few of whom have the least idea of the amount of thought, labour, and time that have been expended in order to accomplish the purpose of satisfying their daily and hourly need.

The quality of water supplied for domestic use of course forms an important item for examination. The lines on which such investigation should proceed are carefully explained, but one remark in connexion with "surface waters" is open to question—viz., that "such waters, if derived from hard rocks in a sparsely-populated and agriculturally

\* "The Principles of Waterworks Engineering," By J. H. Turner, M.Sc., and A. W. Brightmore, M.Sc. London: E. & F. N. Spon.



barren district, are well adapted for irrigation purposes." If by irrigation is intended its application to growing crops, it is obvious that when water is highly charged with fertilising matter, both in mechanical suspension and in chemical combination, it is infinitely more valuable than when it flows perfectly pure and clear. Opinions, too, are divided on the point as to the self-purification of streams during their flow, some authorities still maintaining that the oxidation of impurities is effectively carried on in rivers of large volume which run rapidly over a moderately long course, and so the remark, "that aeration and the agency of plants and animal life do not produce a much more marked effect than that of the limited extent formerly assigned to them," must be accepted with some reservation.

In the chapter devoted to the "Measurement" of water, instances are quoted of extraordinary falls of rain in various countries. Perhaps few persons are aware that at any place in the British Isles so large a fall as seven inches in twenty-four hours could possibly be recorded, as at Seathwaite; but in countries subject to the influence of tropical monsoons much heavier falls frequently happen. It is, however, rare for storms of excessive rain to be spread over a large area. Even in the basins of the largest rivers, both in the Eastern and Western Continents, such storms never occur simultaneously over the whole extent of the basin.

The gauging of streams and rivers with a view to determining the proportion of rainfall which becomes actually available requires, in the case of small volumes, a series of very careful observations. The application of formulæ deduced from experiments conducted in small artificial channels is quite misleading in the case of large rivers; so many local peculiarities arise to render even the most careful observations inapplicable, not only to rivers of similar type, but even to the same river when made by different observers, as, for instance, those on the Mississippi, by Mr. Ellet, which differ from those made by Humphreys and Abbott, of the U. S. Engineers, who were amongst the first to discover that the maximum velocity in large rivers is found, not at the surface, but at varying depths below it, owing to the friction of the air and also to the direction and force of the wind prevailing at the time of observation.

In Messrs. Turner and Brightmore's treatise the intricate questions connected with determining the maximum and mean velocities on which the accurate measurement of water depends have been exhaustively investigated. The theories and experiments of well-known authorities have been analysed and compared, and elaborate calculations of formulæ reduced to simple terms. It is not necessary here to particularise the various methods and mechanical appliances employed in the measurement of water for collection or distribution, for they are carefully enumerated and their respective merits clearly discussed, so that the engineer can easily make his selection of any he considers best suited to his requirements. But paragraphs 136-140 deserve special attention, as they contain an interesting description of the diamond-drilling apparatus used in borings for water. It is perhaps known to but few that such borings have been carried down to the depth of a mile and more, as at Schlödenbach, in Prussia, where a bore with a diameter of 11.2 in. at top and 1.25 in. at bottom has been driven 5,734 ft. But the temperature of water is found to increase so much at great depths (1.8 Fahr. for every 100 ft. is the rate in England) that it is questionable how far it is desirable to supply water of such temperatures for domestic purposes.

Chapter IV. is devoted to the important item of "Storage," to which more attention has been directed perhaps than to any other branch of water engineering. The Creator "binds up the waters in His thick clouds, from whence they drop and are distilled upon man abundantly," but it is left to man

to collect and store those waters and prevent their running off wastefully to the sea. Hence the constructors of reservoirs have been from the earliest times considered as benefactors of their age, and, more especially in Eastern lands, remains have been found of structures which for vastness of conception and excellence of work will compare favourably with the works of more modern days. The progress of science of course has conferred advantages on the engineer of these days by enabling him to employ the material at his disposal with greater economy, but modern structures have not by any means dwarfed the magnificent works of bygone centuries. There are many reservoirs in India with lofty embankments and water-areas covering several square miles. In nothing has the skill of those old native engineers been exhibited more than in their selection of sites and in the adaptation of the material ready to their hands; but masonry dams are certainly few in number.

The subject of storage is very thoroughly dealt with in the treatise. In our islands, where the yield and supply of water available are not so enormously disproportioned as in the large eastern and western continents, many points have to be considered, which need not otherwise occupy attention so far as site and size of the work are concerned; but too much care cannot be exercised in regard to the materials and relative dimensions of reservoirs, for a catastrophe such as the bursting of a dam commanding densely populated cities or towns means an overwhelming calamity, involving loss of life and property beyond calculation. It is, therefore, indispensable that no possible precaution which human knowledge or experience can devise for ensuring absolute safety should be neglected. The form which such precautions should take is carefully analysed and set forth by the authors, both as regards earthen embankments and masonry dams. There is not much difficulty in determining the dimensions of the former class of works, or in calculating the resistance to the mere statical pressure of impounded water. A great deal of stress, however, is laid upon the puddle wall in respect of material and dimensions, and of the position in which it should be placed. Doubtless there are reasons for such walls in this country, but in India no such thing exists in the many thousands of reservoirs which have been constructed by native engineers. It is quite a debatable point, when a puddle wall is necessary, as to whether it might not be preferably and more profitably utilised in covering the inner slope, rather than in the centre of an embankment. It would, of course, have to be revetted with a thick pitching of large, roughly dressed stone, which in any case, however, would have to be provided as a protection to the inner slope against the action of waves during severe storms.

The weak point in most earthen embankments of earlier construction is truly shown to be the position of the outlets and waste weirs. No more hazardous arrangement could have been adopted than that of building the discharge sluices or pipes in the centre of the embankment itself. In the case of large and deep reservoirs they should, as recommended, be carried through the solid ground on either flank.

As regards the relative merits of earthen or masonry dams, a great deal depends, as the authors remark, on the quality of the material available at the proposed site and the consequent relative cost of construction. As a matter of fact, however, homogeneity of the mass can be secured with greater certainty in carefully-constructed dams of earth than in a masonry wall of great thickness. A case of settlement can be more easily remedied in the former than in the latter, and an earthen dam gives longer warning of any weakness or sign of yielding than a masonry one, and so allows time for relieving the pressure by partial emptying of the reservoir, whereas the collapse of a masonry structure is comparatively instan-

taneous and therefore correspondingly disastrous. The time, too, occupied in construction is much longer in the case of masonry, and is more than proportionately costly. But there are sites, of course, where only a masonry dam is possible, as, for instance, in the present disputed site of the proposed dam across the Nile at Philæ, the demerits of which have already been discussed in the columns of this and other periodicals. The calculations involved in the case of high masonry dams are more complicated, and have formed a subject of very close investigation by many distinguished engineers and mathematicians. The essential conditions of strength and stability are stated in paragraph 224, and subsequently worked out in detail both mathematically and graphically, and the results are conveniently tabulated at the close of paragraph 242, in which it is shown that for a dam 111 ft. high the breadth at base must be 74.6 ft., and for one 150 ft. high, the base breadth must be increased to 113.3 ft., while the weight of masonry is raised from 264 tons to 493 tons, or at the rate of nearly 500 tons for each foot in length. An idea may thus be formed of the extreme care which must be exercised in the actual building, in order to secure homogeneity in such an immense mass of masonry.

One type of masonry dams, sometimes, but not commonly adopted—viz., the "arched form," is also described and illustrated; diagrams, with particulars of dimensions, are furnished of two such works which have been erected in California—viz., the Sweetwater and Bear Valley Dams, 90 ft. and 64 ft. high respectively, in which the breadth at base in each case is less than that prescribed for straight dams. All the instances of arched dams mentioned apparently consist of a single curve from bank to bank, but there exists near the City of Hyderabad in the Deccan a dam of unique form, comprised of a series of arches, and resembling a bridge thrown on its side. It is difficult to conceive what advantages the designer of this work could suppose were gained by the adoption of this particular form, which can only be regarded as a curiosity in its way.

The precautions to be adopted in the construction of masonry dams recommended in paragraph 256 are much to the point, especially in regard to the use of a slow-setting hydraulic lime. In tropical countries, where the heat of the sun and dryness of the air are so great during the rainless season, that precaution is well understood. Not only is the mortar used very wet, but all the material, whether brick or stone, is saturated so as to reduce the loss by rapid evaporation and absorption of the moisture from the cement. As an additional precaution, sand is spread over every fresh course of masonry and kept constantly wetted, so as to allow the process of setting to take place gradually and thoroughly.

The chapter following that of storage is devoted to the subject of the purification of water previous to its distribution, and a description of the various processes adopted at home and abroad for separating the mechanical and chemical impurities found therein. As to the relative efficiency and economy of the different methods employed, opinions will, of course, differ, and they necessarily depend, more or less, on the different constituents of the water dealt with, and the locality from whence it has been drawn. The degree of "hardness" is a question which much exercises the mind and the temper of the female householder, and, perhaps, the familiar advertisement of "Don't worry—try Sunlight" may prove to her, after all, the quickest practical solution of the difficulty. There is one point, however, for which there is much to be said on both sides, and that is how the condition of purity arrived at can best be maintained during the interval of time that must necessarily elapse between the treatment of water and its supply to con-



sumers; that is, which is the best location for purification works—whether they should be placed nearest to the intake or to the centres of distribution. The opinion recorded is that "naturally filtered water should be protected from the light until it is supplied to the consumer, and that it is in the highest degree essential for every kind of water intended for dietetic use to be maintained at a low and equable temperature after it has been brought into a pure condition."


The "conveyance" of water for domestic use must obviously be preserved from all contaminating influences. In ancient times open aqueducts, of which such remarkable monuments exist in the Roman Campagna, were universal, though even in those days, as the Pompeian Museum reveals, both iron and lead piping were employed in public baths, and for individual houses of the wealthy classes. The advance of civilisation however demands, and improvement in the mechanical arts admits of, an economical compliance therewith, the substitution of underground iron aqueducts, the dimensions of which can be accurately adjusted to the wants of each locality. Hence the discussions which have arisen as to the most suitable arrangements for the conveyance of water in main conduits and for an exact control over its distribution in detail, questions which are treated in the sixth and seventh chapters, and which have necessitated many ingenious experiments on the motion of water in pipes, and somewhat intricate calculations to determine with accuracy the volume deliverable under many varying conditions without unnecessary waste. One condition, the failure to observe which is a prolific source of trouble and annoyance to the householder, especially during winter, is the necessity of allowing a considerable excess of strength in pipes to meet the extra strain occasioned by expansion during the process of freezing, and the effect of impacts from the sudden arrest of motion in a column of water under a very high pressure. The full force of this impact, sometimes known as "Water Ram," cannot be determined by calculation, but its effect has been demonstrated in an experiment by Mr. A. R. Binnie, in which the pressure on a 3-in. pipe, 114 ft. long, and branching off a supply-main and furnished at the end with a plug-cock, measuring 0.152 of an inch, was at the branch 120 lbs., and at the open cock itself 20 lbs. On the cock being shut quickly those pressures were for the moment found increased to 220 lbs. at the branch and 550 lbs. at the cock! The strain thus suddenly caused may be imagined, and illustrates the force which may have to be provided against.

The treatise concludes with the last and not altogether least important subject of "Maintenance." In every branch of water engineering, the best-constructed system of works will fail to be satisfactory unless systematically and carefully maintained. The remarks with which this point is urged are very true, that maintenance should at the outset occupy the consideration of the engineer conjointly with the capital outlay likely to be involved by any proposed project, and that, "in a comparison of rival schemes, the prime cost of construction must be regarded as only one of the factors that are to determine their relative merits." Of course, with the question of cost of maintenance must arise the price to be charged to the consumer. Judging from the value put upon their property by the respective Metropolitan companies, and the high market value of their shares, the rates now levied by them must be very considerably in excess of the actual outlay incurred in maintenance, so that the powers conferred on them by Acts of Parliament might with much propriety, and without hardship to the shareholders, be now revised. There are several anomalies, and an absolute want of equity, in the powers given to charge for baths and water-closets. The demands of nature do not corre-

spond to the number of conveniences of either kind in a house. Some more rational mode of charges may surely be adopted than making, say, five persons pay for their morning ablutions five times as much for the privilege of performing them simultaneously in five separate baths, than consecutively in one bath. In the other case it is equally, if not more, absurd. Of course, it is argued that there is so much waste, and doubtless there is, but this only means that careful householders are taxed for the careless. Naturally the true remedy that suggests itself is payment according to quantity used, as for every other article bought in the open market; but to this it is remarked that the legislature of this country has shown itself as consistently opposed to the sale of water by measure for domestic consumption. It is also remarked that "the difficulties inseparable from attempts to measure domestic water supplies with extreme accuracy have not been entirely overcome." Be it so, but is "extreme accuracy" required? It will not be contended that there is any accuracy at all in the charges which are made under existing powers. There is certainly ample margin left to cover inaccuracy, judging from the enormous dividends of the companies under the present irrational system. There is perhaps more reason in the other argument, that the cost of introducing the system of measurement into towns in this country would be often prohibitive. It has not, however, been found so in the case of gas consumption; but if the prohibition of costliness is a comparative term, referable rather to the diminution of existing dividends than to actual prime cost, the argument is not tenable in the light of the public interests. This is, however, by the way, and but an opinion on as yet an untried measure.

Messrs. Turner & Brightmore's treatise is in every respect a valuable contribution to the literature of the profession for whom it has been compiled, and its authors would certainly have met with commendation from the distinguished engineer to whose memory their work is dedicated.

#### NOTES.

 A meeting of the Archaeological Institute on Wednesday afternoon, Mr. Somers Clarke, who has recently spent some time in Egypt, read a very effective paper on the question of the proposed Nile dam and its effects, under the title "The Devastation of Nubia." The main point of Mr. Clarke's paper was that, even if a position were taken for the dam which would not affect the island of Philæ, a large number of other monuments would be destroyed over a length of 116 miles in the course of the river, including the remarkable temple of Kalabshah; he gave a list of sixteen remains of important buildings which would be lost. Describing in detail the remains on the island of Philæ, he pointed out many minor remains of interest on it besides the more prominent and well-known ones, and showed that the scheme of raising or rebuilding the larger structures, even if one could admit that as any satisfaction as far as they were concerned, would still leave a great quantity of interesting remains to be submerged. He also estimated that from 25,000 to 30,000 people of the lower order would be drowned out of their homes and have to find some other place to live, and that no provision or consideration had been made for these. Mr. Clarke pointed out also that Mr. Willcocks, the engineer who had brought forward the whole scheme, had shown his ignorance of Egyptian antiquities by the very remark that he had prepared an alternative scheme which would avoid touching Philæ, he being apparently entirely unaware of the other remains—Kalabshah, Kom Ombo, Debod, Tafah, Dendur, Dakkeh, &c.—which would be destroyed even if Philæ were spared. In the course of the discussion, Mr.

Petrie expressed a fear that the bait, as he called it, of eight millions a year of prospective profit, was too strong an appeal to the predatory instincts of the Egyptian Government and the trading classes to leave any hope that we could prevail against the scheme on the mere ground of the interest in antiquarian remains; the most we could hope to do would be to endeavour to procure that the least mischievous scheme should be adopted out of the four proposed. The paper was illustrated by plans of Philæ and Kalabshah and of the Nile basin, and by a number of water-colour drawings of the various temples by Mr. R. Phené Spiers, who also took part in the discussion.

THE German architects are to have their biennial congress next month at Strasburg, where great preparations have been made to ensure the success of the meeting; and as many interesting papers are to be read, and a number of modern monumental works can be seen in the city, the meeting will probably be a good one. An elaborate volume on Strasburg architecture, past and present, is being published, and will form a valuable addition to the series which is now regularly appearing on the different modern German cities. As in former cases, each member of the Congress will be presented with a copy. The actual business meeting of the executive of the Amalgamated Societies of German Architects and Engineers takes place a few days previous to the general gathering, and it will be there that the programme of the technical research and publishing to be done by the allied societies during the next two years will be arranged.

THE report of Dr. Orme Dudfield to the Vestry of Kensington, on the sanitary condition of the parish for the four weeks ending June 16, contains a useful historical sketch of the progress of the efforts which have been made for a good many years past, and in which Dr. Dudfield and his vestry have been active, towards the compulsory sanitary regulation of bakehouses. For years Dr. Dudfield has been urging that some authority should have power to make and to enforce by-laws for the sanitary regulation of bakehouses. No authority has, however, as yet been given any such power, though there seems to be some probability that the London County Council will eventually be empowered to make by-laws on the subject. The power of entry to bakehouses was, however, given to sanitary inspectors in the Factory and Workshop Act of 1891, and Dr. Dudfield expresses the hope that, whoever may make the desired by-laws, the duty of enforcing them should still rest with the local sanitary authority.

IT appears from some recent notes of the *Times'* Paris correspondent that the French have just discovered the existence of a painter named Turner, one of whose works it has been proposed to present to the Louvre. It is to be hoped they may go on and discover the existence of Constable and Crome and one or two other English painters who are the real fathers of the recent French school of landscape—the school of Dupré, Rousseau, and Corot—and are influencing French painting at the present moment, though their names seem to be unknown to the French art-critic of the day.

WE read that Mr. William Japp, of Broomhall, has lately effected a restoration of the house in which lived, temp. Robert III., Katharine, the Fair Maid of Perth, daughter of Simon the Glover, having purchased it from the local Guild of Glovers. In the times described in Scott's novel that fraternity had their shops and homes for the most part in the Skinnergate, but their archives show they possessed considerable property, consisting of land and houses, in Curfew-street, or row (where dwelt Simon



the Glover), which surrounded the castle yard, and had been first built, probably, soon after the castle was razed, and its moat filled up, by Robert Bruce. Curfew-row has since enclosed the Skinners' yard, formerly the castle court-yard, but was then a thoroughfare or avenue, leading from the north part of the town to the outlying Black Friars monastery. The Dominicans' gardens, renowned for their extent and beauty, adjoined North Inch; Rose and Barossa streets, the Crescent, and Athol-place cover a portion of their site. At the south end of Rose-street stood, it is supposed, the Gilten Arbour, or summer-house, from a balcony whereof King Robert witnessed the conflict between the clans Quhele (perhaps Kay) and Chattan, in which Torquil and Hal o' the Wynd engaged so fiercely. Monks' Tower—a round watch-tower at the town's then south-east angle—was situated by the corner of the Earl of Gowrie's garden; it had a ceiling painted with many strange allegorical and astronomical devices, copied, they say, from those on the Gilten Arbour; and was pulled down, together with Gowrie House, in 1807. In the wall of the corner house in Curfew-row, by the Blackfriars' Vennel, is a niche wherein hung the curfew-bell. This house formed part of St. Bartholomew's Chapel, where the Glovers held their trade meetings. Gowrie House, bestowed by the magistrates in 1746 upon the Duke of Cumberland, lay just east of the junction of South (olim South High) street and Watergate, near the Tay's right bank, where are now the County Buildings and Gaol.

It is stated that the Dean and Chapter of Peterborough have instructed Mr. Pearson to design a memorial to Queen Katharine of Arragon, and will also erect one in the cathedral to Mary Queen of Scots. Concurrently herewith, attention has been directed to the condition of Fotheringhay church. Mr. H. M. Townsend, A.R.I.B.A., of Peterborough, writes to a daily contemporary:—

"I can fully confirm the opinion that this noble building is in a most dangerous condition. At the request of a former incumbent I made (in 1882) a careful examination of the fabric, and at that time the roofs of the nave and aisles, and several of the beautiful flying buttresses, were found to be in a dangerous state."

Deformed by the loss of its earlier choir, Fotheringhay church, its tower surmounted by a later octagon lantern, and spirelet with a falcon and fetterlock for vane, stands on the river's left bank, a conspicuous landmark in the Nene valley. It was given to the convent of De la Pré, near Northampton, by Simon de St. Liz, second Earl of Northampton, who founded it, as a vicarage, temp. Henry II. In 2 Henry V. the abbess gave it to the College of the Virgin and All Saints founded at Fotheringhay by Edward, Duke of York, 1412, in place of an ancient nunnery there. Edward, before he went to France, where he fell at Agincourt, agreed to pay William Harwood, "freemason of Fodringey," 300*l.* for rebuilding the body of the church—as now—to be 80 ft. by 60 ft., with two aisles, each having six buttresses, a west window of four lights and five side windows of free-stone, like those in the choir, a clearstory with windows to correspond, a tower 80 ft. high, 20 ft. square within its walls 6 ft. thick, a north porch 12 ft. long, a west door, and a south porch joining the cloister-door. Edward IV. refounded the college, whose possessions in many counties, including property in Holborn, City of London, are assessed in a survey of 1535 at 48*l.* 1*5s.* 9*d.* yearly. Leland says in his "Itinerary"—

The fair cloister . . . was made in King Edward the IVth's days, one Felde being master of the college. . . . This Felde set the verses of the book called *Exhibition terra*, in the glass windows with figures, very neatly.\*

\* He means the Eclogues of Theodulus, Bishop of Palestine, *abijt* 480. In Bridges' "Northamptonshire" are drawings of all the figures in the windows, the vacant spaces of which are filled with buckles, lions, roses, angels with harps, and the falcon and fetterlock—a cognisance of the Dukes of York.

Edward IV. brought hither from Pontefract the body of his father Richard, slain at Wakefield, for burial on the high altar's north side; here, too, were buried Edward, Duke of York; Richard's son, the Earl of Rutland, murdered by Lord Clifford; and Richard's wife, Cicely Nevill, who passed thirty-six years of her widowhood at Fotheringhay Castle, where she gave birth to Richard III. Camden tells us that all these had magnificent monuments, which were demolished, together with the chancel, their bodies being thrown into the churchyard, by the Duke of Northumberland,\* who also pulled down the college, given to him temp. Edward VI. On visiting Fotheringhay in 1573, Elizabeth ordered two monuments to their memory to be put up in the church, and that a stone bridge should replace the wooden one across the Nene. Edmund of Langley, Duke of York, rebuilt Simon de St. Liz's castle at Fotheringhay, and planned its keep in the shape of a fetterlock; he acquired it from Mary of Valence, Countess of Pembroke; it passed subsequently to Henry VII.'s consort, and then in dowry to Katharine of Arragon. The popular error that James I., moved by filial piety, pulled down the castle is refuted by the fact that he bestowed it upon Lord Mountjoy, and by a survey made April 3, 1625 (a few days after the King's death), which specifies its several buildings, two ditches, &c. The central mound remains, the outworks and the moats can still be traced. Authentic views of the castle are rare; we know not what trust may be placed in the representation of the hall in the "memorial" whole-length portraits of Mary Queen of Scots that were lent to the Stewart Exhibition, 1889, by Her Majesty, Lord Darnley, and Blair's College, Aberdeen.

A CORRESPONDENT sends us the bill for the last mitre made for Worcester Cathedral. The details are derived from the private account-book of the last Prior but one. This book, still in the possession of the Cathedral Body, contains, amongst other matters, the bill for a mitre for the monastery. We may believe it the last made—firstly, because the accounts from which the bill is taken make no mention of any other; secondly, because in the time of the next Prior the whole monastic body was dispersed by Henry VIII. Our bill tells us nothing of the shape of the mitre, but we may, from portraits, &c., conclude its appearance to have been much like the cumbersome form we are all familiar with. The following is the account, the arithmetic is faulty:—

"Item to John Cranckes, gold smyth of london, for al manner of stuff belonging of the new mytur with the making of the same as hit apereth by parcels folowing—  
In primis, for v grette stones . . . xvjs. viijd.  
Item, for xx + vj + stones, prece viijd.  
apeece, to the frontes . . . . .lvjs. iijjd.  
Item, for xvj stones, sett in golde, weyng di vnccs. . . . .xvijs. iijjd.  
Item, for xl. medyll stones, prece vjd. a stone . . . . .xns.  
Item, for xx + xv smale stones, prece iijjd. a stone, to garnesse . . . . .xxvs.  
Item, for iij vnccs & a quarter of fyne peerll, at iijli. the vncc . . . . .iijli. xvs.  
Item, for iij vnccs of medull peerll, at xs. the vncc . . . . .vjli.  
Item, the seluer warke weys in all xxx xij vnccs; whiche is, with the fasschoon t & all . . . . .xxiijli. xvjs.  
Item, to the broderar vj wokes, & sijd. a day besydes mete & dryncke . . . . .xxxvj*s.*  
Item, payd for lynnyn cloth to coweche yt on, with perll. . . . .vij d.  
Item, for Sylke, to thred the seid perll & steche the peerll, vncc & di. . . . .xv d.  
Item, for yelow thred . . . . .j d.  
Item, for Rybande of iij d. brede, ij yeardes . . . . .vij d.  
Item, for Reband of ij d. brede, A yearde . . . . .ij d.  
Item, for Rownde selke about the bordure . . . . .j d. ob.

\* The oak sedilla or stalls are in the neighbouring church of Tansor, restored by Mr. Ewan Christian; see the *Builder*, July 3, 1886.

† 86. ‡ Unintelligible.

§ Probably wekes.

Item, for red selke, to sow hytt withall, iij d. ob.  
Item, for past . . . . .iij d.  
Item] for a quarter of sarcepet to lyne hytt . . . . .xiiij d.  
Item, for a case to the mytur, of lethur . . . . .iij d.  
Summa xliix li. xv s.  
the costes of the mytur."

ONLY a few weeks ago, the city authorities of Glasgow made themselves ridiculous by finding out impropriety in engravings from some well-known pictures (Sir F. Leighton's "Bath of Psyche" among others), which thousands of innocent persons have looked at without suspecting that they were condoning immorality. The authorities of the city of Preston seem to have been determined, in American phrase, to "go one better" than the people of Glasgow. If we are correctly informed (it seems almost incredible), the Harris Museum at Preston has just been purified by the turning out from its precincts of a plaster cast of Michelangelo's "David," by order of the authorities! We could understand objection to some nude statues, both ancient and modern; we should have a certain sympathy with an official objection, for instance, to the Venus de Medici, an essentially vulgar work; but an objection to Michelangelo's David could only be sustained on the ground that all nude sculpture is *ipso facto* improper. In that case there is an end of sculpture. Do the Preston authorities intend also to hang a sheet in front of Mr. Mullins's fine figure of the Athlete, in the pediment of the Harris Institute?

#### LETTER FROM PARIS.

THE principal committee of the 1900 exhibition is already occupied with the classification of the exhibits, which according to the scheme of M. Picard, the General Commissioner, are to be divided into seventeen groups. Without enumerating all these, we may say that works of art will form the second group, subdivided into separate classes; class seven, paintings and drawings; class eight, engravings and lithography; class nine, sculpture and medallions; class ten, architecture. There now remains the important question of the public competition, which ought to be arranged at once. The architects and engineers all desire the prompt solution of the problem of providing so many constructions in so short a time.

The Café Riche, a building formerly so celebrated, and which for so many years was the centre of attraction of the "tout Paris" of the Boulevards, has been metamorphosed into a "Brasserie," following the taste of the day, which were the violent and gaudy decorations now in fashion, to the old wood-work in white and gold; this transformation is interesting from an artistic point of view, for the architect in charge of it is no other than M. Albert Ballu, who has not only engaged well-known artists to paint the ceilings, but has sought the aid of such decorative processes as ceramic, enamel, and mosaic. Without speaking of the rooms which MM. Barrias, Dubufe, Doucet, and some others have decorated with more or less success, we will confine ourselves to the decoration of the facades towards the Boulevard des Italiens and the Rue Le Pelletier. At the level of the first story M. Facchina has executed a long row of panels in mosaic, after cartoons by Forain, the caricaturist. Newspaper-sellers, cyclists of both sexes, jockeys and bookmakers, scenes at the ball, and scenes at the restaurant, succeed each other with the same commonplace and crude colouring, in a framework of gold enamel. The general effect may be original, but it is deplorably anti-architectural. Add to this figures of women in modern costumes, carved in alto-relief and highly coloured, and you have an ensemble which is absolutely astounding. If this is the new decorative art of the future, Heaven preserve us from it and bring us back to the taste of the good old times, to the simple illuminated escutcheons of our fathers, as we see in some examples at the Musée Carnavalet, which, if they had little artistic pretension, had at least the merit of picturesque effect. Let the architects leave M. Forain to his lively caricatures in rather doubtful taste, and if they wish to utilise mosaic—which we entirely approve of—at least let them



associate it with an ornamentation really decorative and harmonious.

The École Polytechnique, which recently celebrated its centenary, must soon receive important additions, and this is made the occasion for again demanding its removal outside the city. The members of Parliament who represent the Seine-et-Oise department insist strongly that the school ought to be rebuilt at St. Cloud, on the site of the old château; which would be a deplorable step. The ruins of St. Cloud have now entirely disappeared; in their place extend large terraced gardens, communicating by stone steps with the alleys of the Park. The effect of the grassy lawns on this rising ground is charming, the view from it equally so, and the rebuilding of the École Polytechnique on that site would be an act of vandalism for which Parliament will hardly make itself responsible. Nevertheless, in regard to artistic perception, that same Parliament leaves much to be desired. Several of the Paris papers have criticised, not without reason, the indifferent manner in which, when the two Chambers are united to elect a chief of the State, the dignitaries of the Senate take possession of the most interesting apartments, historically and artistically, of the Palace of Versailles. Thus M. Challemeil-Lacour, President of the Senate, installed himself a few days ago, with his family, in the apartments of Louis XV., and, accordingly, the workmen of the Mobilier National brought his furniture in all forms and styles into the midst of the delicate work of the old Louis XV. chambers. Whatever care may have been exercised over this provisional installation, it cannot but cause anxiety to those who appreciate the marvellous work with which the art of the eighteenth century has adorned this portion of the Palace. Parliament really ought to put a stop, for the future, to this transformation of a National Museum of French decorative art into a "Hôtel Meuble."

Twenty-five architects took part in the competition opened by the Société des Architectes Français. The subject of the competition was "Une Villa aux Environs de Paris, à Destination d'Habitation Permanente." After examining the designs, the jury, presided over by M. Havard, awarded to M. Gienne Ferrin the first prize, offered by the Minister of Fine Arts. The second prize, offered by the Minister of Commerce, was awarded to M. Fernand Lorain. M. Louis Lahaure obtained the third prize, offered by the Chambers Syndicats des Bâtimens. M. Charles Girond received the fourth prize (a silver medal), and MM. Bricard and Brossart the fifth and sixth prizes (bronze medals). These three last prizes were given by the Société Nationale.

The annual exhibition of the "Envois" from the Villa Medici has just been opened at the Ecole des Beaux-Arts. It consists of a number of very mediocre efforts, among which an interesting work is found here and there. One of these is that of M. Dewambaz, who has certainly more qualities of colour and originality than most of the pupils of the school. He has treated the legend of Saint Agatha in a strongly accented style, and entirely in defiance of the conventions of the "Ecole." M. Dewambaz has certainly a special talent which is likely to bring him into notice, when he has once got rid of those influences of the atelier which so often paralyse the first efforts of young students. We like also the Pegasus of M. Lavallée, who, however, seems to be hesitating very much between classicism, impressionism, and what must now-a-days be called the "pointillisme" invented by M. Henri Martin. Mr. Lavergne has sent a well-studied figure of "David," but which has no very special character.

In architecture the drawings of M. Sortais (part of Hadrian's Villa), M. Pontremoli (restoration of the arch of Trojan at Ancona), and MM. Eustache and Bertone (various studies and fragments), testify to serious study, and are very well executed. The "envois" in sculpture are not of much interest, with the single exception of the "Iouragan" of M. Lefebvre, vigorous enough, though somewhat heavy.

M. Coutan has been appointed professor for the evening classes in sculpture at the Ecole des Beaux-Arts, in place of M. E. Barrias, who has been appointed a member of the Conseil Supérieur. While we are speaking of the Ecole, we may indulge in a word of criticism as to the monument to the architect, Rougevin, recently erected near the Cour du Mûrier. The mosaic column, with its gilt capital seen against a strongly-coloured background, has not a good effect, and contrasts disagreeably with the architectural character of the Regnault monument, and the simple lines of the "Jeunesse" of Chapu, in its immediate neighbourhood.

#### THE COMPETITION FOR THE RECONSTRUCTION OF THE ST. MARLYBONE PUBLIC BATHS AND WASH-HOUSES.

The result of this competition was briefly noted in our last issue. The expenditure of a sum of about 40,000*l.* attracted no less than thirty sets of designs, which have been exhibited during this week. We cannot refrain from expressing regret that the Baths Commissioners did not pay more attention to the proper exhibition of these designs, as it is only fair to the architectural public which replies to their invitation to compete, and to the ratepayers and others who are interested in the proper expenditure of the money, that all the designs should be exhibited in one room, or at least in one building. This need was not met by the exhibition of the three premiated designs in the board room of the Baths Building and the remainder of the designs in a small house in Boscobel-place, some half-a-mile away.

The site upon which the new buildings will stand is now occupied by the existing baths. It is roughly shaped with frontages to Marylebone-road and Seymour-place; the interior angle is occupied by the Marylebone County Court. The facilities for lighting the interior were bad, and the light was principally obtained by the competitors from the two frontages, by top lighting, and by the provision of interior areas. To provide the necessary accommodation that the conditions required, was doubtless no easy matter, taking into consideration the restrictions of the site; and very few of the competitors have produced a really good plan, an essential in the design of a building of this description. The difficulties were not lessened by a request in the conditions that the existing Pompeian baths in Seymour-place should be retained if possible, with a view to economy, but it is open to question whether it would not have simplified the planning and given a better result if this portion had been boldly removed. Several competitors took this view. The conditions which were issued to competitors appear to have been prepared with care, and special attention was called to the economical working of the staff employed and its easy supervision, to the drainage and ventilation, and to the disposition and arrangement of all pipes and drains, so that they could be readily inspected and repaired. Separate entrances were required for first-class men, first-class women, second and third class men, and a private entrance for the commissioners and superintendent, and it was stated that the entrance for washers, second-class women's private baths, boiler-room, and coal stores must be in Seymour-place. With these restrictions the accommodation asked for comprised sundry additions and alterations to the existing Pompeian first-class swimming-bath for men, men's second and third class swimming-baths, a ladies' swimming-bath, and 110 private baths, divided as follows:—24 private baths and 2 vapour baths for first-class men; 55 baths for second-class men; 10 baths for first-class ladies; and 19 baths for second-class ladies. A wash-house and laundry was required, with 80 washing-boxes, hydros, and drying-houses, and a large ironing-room. A home laundry was also required. The staff department requirements included superintendent and matron's residence, board-room, and superintendent's office. A further restriction that was mentioned referred to the inadvisability of placing drying-houses or heating apparatus of any description against the premises of the Yorkshire Stingo Brewery on the west boundary.

Mr. John Johnson's design, which holds the first place in the assessor's award, shows great merit in plan, and gives the required accommodation with such direct communication as will give most ease in administration. The slipper-baths are shown with a single central corridor with baths on each side, so that complete supervision is readily obtained in a way that is impossible if cross passages are adopted. The ladies' first-class swimming-bath and private baths are in a readily-accessible position, on the east side, and at the same time the entrance has the privacy which is so desirable for this class. The staircase at the north-west angle for the superintendent is also a most useful feature, and gives access from top to bottom of the establishment; and the lavatory arrangements appear to be ample and well placed. Mr. Johnson has not feared to utilise heavy girder work and columns in carrying his main front over the two swimming-baths sunk below the forecourt and in projecting his first floor over the laundry roof, but though this is an additional expense, the simplicity of plan that exists almost justifies the means employed. The striking features in Mr. Johnson's plan are a very straight

corridor to the Pompeian baths from a central hall on ground floor, from which a staircase leads to the men's second and third class baths under the forecourt, and staircases also lead to the baths on upper floors. The ladies' first-class swimming bath is on the east of the corridor, with private baths adjacent and accessible. The laundry is kept on a lower ground floor on the west side, and the engine and boilers are immediately below in the basement. The elevations Mr. Johnson proposes to execute in Portland stone entirely. The phase of Renaissance treatment is similar to Mr. Johnson's previous work, which is now well-known, but not much liked. The award of the first premium to this design on the strength of its plan cannot be well disputed.

The design of Mr. Saxon Snell, which takes the second premium, is considerably behind that of Mr. Johnson's in point of merit, the plan not being such a good one, though the elevations are better in some respects. The second and third class baths are placed under the forecourt, the ladies' swimming-bath being placed at the back and top-lighted. The ground floor has central entrance, with superintendent's office on west and board-room on the east side; the establishment laundry is placed on the west boundary, whilst the public laundry occupies a position at the back, with separate entrance from Seymour-place. The entrance to the Pompeian bath is also in Seymour-place, so that the means of communication between the separate departments is hardly so complete as it might have been.

The first floor is mainly occupied by the different blocks of private baths, which are not arranged in the best manner for supervision. They are lighted by large central areas, at the bottom of which are the top-lights of ladies' swimming-bath and the public laundry. The second floor plan is occupied by the superintendent's home.

Messrs. Ardron & Cheers secure the third premium with a design which does not appear to have many features in its favour as far as we have been able to see. The forecourt is occupied with the men's baths, and the ladies' swimming-bath is placed on the west side, with the boiler house and laundry establishment in the centre. The main angles of the building are either acute or obtuse, and no effort to secure squareness of plan seems to have been made. On the ground floor the washhouse occupies a central position, and has an entrance in Seymour-place, but the ironing-room is placed on the first floor, a doubtful arrangement. The first floor is occupied by the private baths, but their arrangement is not good for supervision, whilst the men's second-class baths are relegated to the second floor, where house accommodation is provided for the superintendent. The elevations are moderately good, but are much the better part of the design.

Of the remaining designs, exhibited in Boscobel-place, we can only speak in general terms and by their numbers; their merit is very varied. No. 1 places the two men's swimming baths in front, the ladies' in west side in basement. The shape of the baths is irregular, and the arrangement of boxes inconvenient, and the outside ventilation cowl and lavatories might be improved upon. The arrangement also of the staircases projecting into the entrance halls is unsightly, and the elevations are too ill-proportioned to be referred to. The set of designs numbered 8 is in pleasant contrast to the last, and shows considerable thought and ability. The author has boldly departed from the other schemes, and has entirely removed the bath from Seymour-place, and has placed it along the west boundary, with the ladies' swimming bath in the south-west angle behind the laundry building facing Seymour-place. This ladies' portion has a long top-lighted corridor from the entrance in Marylebone-road, and the entrance is as secluded as could be wished. The men's second-class bath, in the centre of ground floor, is not so conveniently planned as it might have been. The position of the laundry in Seymour-place appears to be the right one, though the separation of the ironing-room and laundry on different floors is not desirable. The ladies' second-class private baths are also well-arranged over the ladies' first-class baths, but with a separate entrance in Seymour-place. In some cases the water-closets would have been better grouped around areas. The elevations are a harmonious arrangement of terra-cotta and red brick suitable to its purpose and in quiet taste and good proportion. The design deserves some recognition, and we are surprised that it has not received it.

The plans numbered 6 are above the average. The author retains the swimming-bath in Seymour-



place and places the ladies' swimming-bath at the west side. The public laundry occupies the centre space of the basement. The arrangement of dressing boxes in side avenues is not the best in our opinion. There are several points in the plan where improvements would be desirable, but the design shows careful preparation and the elevations are in quiet and suitable taste. No. 10 is a set of plans which retains the Pompeian bath, the elevations are good and show considerable ability, but the plans show much weakness. The irregular angles on plan are unreasonable, and there is a distinct want of simplicity about the corridors. The first floor is better in this respect than the ground floor. No. 11 differs from any formerly mentioned in planning, only one men's swimming bath under the forecourt with men's private baths behind. The ladies' swimming and men's second-class swimming baths are placed together in centre of site. The ladies' entrance is not sufficiently secluded, whilst the elevations are too florid and unsuitable to the character of the building. It is a pleasure to turn to the elevations of No. 12, which are undoubtedly the most artistic shown, presumably for execution in stone and red brick. It is disappointing to find that the excellence of the elevations is not maintained in the plans, though there are several good points, notably the central entrance, and the long straight corridor down to the Pompeian bath, which is retained. The laundry seems inaccessible on the west side of first floor. The author is irregular in placing two men's swimming baths side by side under forecourt parallel to Marylebone-road. No. 14 is distinguished by a front elevation of much lavish detail. In many respects it has beauty and is well drawn, but throughout the building the author has introduced much too elaborate detail. The plan is much too intricate for a building of this sort. No. 15 is singular in showing an inclined roadway from the Marylebone-road to the boiler-house on the west side, but this arrangement has not materially affected the plan or simplified the other arrangements. No. 16 removes the Pompeian bath and places the women's swimming-bath next to Seymour-place. The author of No. 21 sends separate schemes shown on two plans, with similar elevations applying to either, the difference in arrangement is caused by removing or retaining the Pompeian bath. In one the Pompeian bath is placed along the west side, and the laundry in Seymour-place. The two baths are then easily reached from the Marylebone-road entrance by a short corridor. We certainly like this plan in many respects, and the elevations take a good place amongst the others. No. 9 shows a new arrangement; the ladies' swimming bath with its long axis east and west, behind the entrance to main building; the arrangement however shows no development that leads to any great gain. As to the award, there is no doubt the first place is occupied by a competitor who submits the best plan and an indifferent elevation. As to plans 2 and 3, the latter especially, we should like to have seen the premiums taken by designs of greater merit.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS:

##### FESTIVAL DINNER.

A FESTIVAL dinner, to celebrate the sixtieth anniversary of the first general meeting of the Institute, held on 2nd July, 1894, took place at the Whitehall Rooms, Hôtel Métropole, on Monday last. Mr. F. C. Penrose, M.A., F.R.S., F.R.A.S. (President) occupied the chair, supported by the American Ambassador, Sir F. Leighton, P.R.A., Mr. Alma Tadema, R.A., Mr. Thomas Brock, R.A., Sir James D. Linton, Mr. W. G. Orchardson, R.A., Mr. Alfred Gilbert, R.A., Mr. Alfred Waterhouse, R.A., Mr. Walter Crane, Mr. W. Bayliss, the Bishop of Ely, the Bishop of Peterborough, the Dean of Rochester, Archdeacon Farrar, the Dean of St. Paul's, Mr. Wolfe Barry, C.B., Colonel Edis, Sir F. Dixon-Hartland, M.P., Lord Kelvin, Mr. Shaw-Lefevre, M.P., Sir Walter Foster, M.P., Admiral Field, M.P., Sir Robert Rawlinson, Sir Douglas Galton, Sir John Stainer, &c., the company numbering over 200 in all.

After the usual loyal toasts, proposed by the President, the toast of "The Houses of Lords and Commons" was given by the Dean of Rochester, and responded to by the Bishop of Ely for the Lords and Mr. Shaw-Lefevre for the Commons. The latter, in the course of his remarks, said that during the existence of the Institute there had been many great architects, who had left their mark on the country. It

would be an important question to discuss how, during those sixty years, additions had been made to buildings of interest to the metropolis. Never in the history of the country had there been greater opportunities, for London during that time had increased beyond all possible expectation. Many opportunities had been afforded to architects, especially on the Thames Embankment. This much he might say, that many considerable and beautiful buildings had been erected during the sixty years, and he was sorry to say there had also been an increase of buildings of an inferior character. For his own part, he believed there was even more to be done in removing and demolishing that which was ugly than in erecting that which was beautiful. He had had the good fortune to demolish the warehouses which stood in front of the Tower of London, and the building at the west front of Westminster Hall. He had also made arrangements to abolish the house which stood in front of the Abbey, and he had reason to believe that would be carried out successfully. Therefore, he thought that better results could often be obtained by carrying out a process of demolition than by erecting buildings of a somewhat doubtful character.\* He hoped the Institute would continue for another sixty years, and that its members would always bear in mind three important facts, viz.—first, to conserve buildings of interest; secondly, to demolish what was useless; and, thirdly, to erect buildings which would add something of interest to this great metropolis.

The United States Ambassador (The Hon. T. F. Bayard), in proposing the toast of "Literature, Science, and Art," asked what was Art? It seemed to be a recognition that there was a perfectibility in the human capacities that should lead men the better to perceive the indestructible nature of their origin, and the purpose of their creation. In such an assembly the boundary lines between the different expressions of humanity, appealing for its liberation—conscious of its origin, and hopeful of its destiny—faded into obscurity, for there was a common purpose and a great object, that civilisation and man's elevation should be helped from every quarter, and by every votary and disciple who wrote Art upon his creed.

The Bishop of Ely responded for "Literature." Both Literature and Architecture, he said, were frankly democratic arts. They appealed to the eye of the passer-by, and it was their endeavour to elevate a man out of his own surroundings. In doing so it was natural, perhaps, for men of letters and architects alike, to begin with a desire for originality. The experience of life, however, taught them the same lesson. It taught that when a motive had once been properly expressed, there was no power of going beyond it, or amplifying it, and it drew them back to those great primary principles upon which, after all, human life was built, and which did not need to be re-discovered.

Lord Kelvin, in responding for "Science," said he must not forget that architecture was the first practical application of science. He often felt, in respect of mere dynamical science, that it was difficult to realise how their predecessors, three or four thousand years ago, succeeded in cutting out the obelisks and monoliths from the native granite, in conveying them, and getting them to stand on end. Dynamical science originated in those works, but science did not end there. They had the building of monuments, temples, cathedrals, town-halls, houses of parliament, and bridges. And what were they to say of the houses of modern London? These were full of science and engineering, with lifts and electric lighting. He would like architects to feel, more perhaps than they had felt in the past, that their beautiful art was not merely a decorative art, and an art which covered their country with beautiful objects, but rather with objects which, while they were beautiful, must also be useful. Houses, too, must not only be useful but be healthy, and science should be applied in all details in the most thorough manner. He asked them, therefore, to consider architecture, not simply as a beautiful art, but also as a magnificent application of science.

Mr. Alfred Gilbert, R.A., replied on behalf of "Art."

Sir F. Leighton, P.R.A., proposed the toast of the evening, "The Royal Institute of British Architects and the Sixteen Allied Societies." In doing so he said he fulfilled the duty, but owned to a feeling of contrition, as, though he was an honorary member of the Institute, he knew but

little of its interior constitution; but perhaps his being asked to propose the toast was a sign that at the present day knowledge of a subject was not a condition which was indispensable. In appreciating this toast they had to keep before their minds the special and far-reaching power and scope of building and architecture. To painting and sculpture it was given, as to music and architecture, to transport the spirits of men into regions of pure and serene emotion, and painting and sculpture did it through the suggestive treatment of the forms and hues of animate and inanimate creation. Like music, they elevated and adorned life; like music, they had no basis in necessity, except the need, common to all men, for spiritual food. But with the art of architecture it was otherwise, for it grappled more closely with life. Its root and base were in necessity; it provided primarily for the satisfaction of material needs; and to it was given the noble and lofty faculty of transmuting into the thing of necessity the divine affluence and essence of beauty. The inevitable surroundings of daily life—the roof overhead, the wall around, and the floor under foot, the buildings in which men lived, legislated, traded, or took their leisure—these could be made to yield sharpening and satisfying nutriment to the highest æsthetic instincts. To such and so great an art it was given to the Institute to minister, and might the Institute long thrive and prosper under so weighty and responsible a duty.

The toast was drunk with much enthusiasm. Mr. J. Macvicar Anderson said he would not have ventured to respond to this toast in the presence of his revered friend, the President, but for the circumstance that Mr. Penrose had specially requested him to do so. It was sixty years since the first meeting of the Institute was held. The meeting was a small one, but the names of those who composed it were not unknown to fame. First and foremost among the names was that of Charles Barry, who he believed was the greatest English architect the century had produced. Among other names of men who attended that first meeting were those of Donaldson, Hardwick, Papworth, and others. Those were the men who convened the first meeting of what afterwards became the Royal Institute of British Architects, and who organised it. He was aware that in these days of federation, combination, and union, such a term as organisation must be received with a certain amount of suspicion. He had lived to see organisations, the first motive of which was laudable in the extreme, become not blessings but curses, and year by year he became more convinced that they would effect not the well-being, but the ruin and distress of the industries they were born to promote. It was, therefore, well to explain that the Royal Institute of British Architects was founded, and was promoted, not for the well-being of architects, but for a far higher and nobler purpose—that which every true architect desired—viz., the promotion of architecture. How important this was all would recognise. If they possessed pictures or groups of sculpture which, from change of taste or fortune, they ceased to take an interest in, the convenient rooms of Christies would relieve them of these. If they ceased to admire those works of music with which they once were charmed, they need not listen to them. Or, in the case of literature, if works which once were favourites had ceased to be so, they need not read them. But with architecture it was different. When the idea of the architect was once crystallised in enduring and material form, it remained from year to year, and from generation to generation, creating emotions in the eyes of the beholders either of hope and gladness, or of depression and despair. How important, then, that everything should be done to promote the best interests of architecture. He might be asked what the Institute had done to promote that object. He could speak volumes on the subject, but he might be permitted to refer to a few points which justified its existence. He observed in the first address presented to the Institute that the most important consideration was the formation of a library. Were it possible for any of the original founders to look in at Conduit-street, they would surely admit that their intention had been carried out, and that a library had been formed, which was second to none in point of interest and of value to the architectural student. The founders further desired that the members should meet and publish their proceedings, and it would be admitted that these were now conducted in such a manner as to convey to the public the information they ought to possess in relation to the art of architecture. Then, with regard to the great subject of education, their views in that respect had

\* It is a pity that Mr. Shaw-Lefevre, during his period of office as President, has neglected the duty of attending to the general handiwork of the Institute.



been so recognized that, in the report of the Royal Commission on a Teaching University for London, it was recommended that one seat on the Senate should be given to a representative of the Institute. There were also prizes, the bursaries, and the travelling studentships of great value, which the Institute offered, to promote the rising talents of young architects; and he would refer lastly to the gift of Her Majesty, who every year permitted them to recommend an architect, or a man of science and literature connected with architecture, who had carried out some work of such importance as to justify his receiving the Royal Gold Medal. It was the glory of this medal that it was not confined to English architects. Only a few days before, the President of the Institute presented it to one whom they gladly recognised in this country as the typical representative of the fine arts, the accomplished President of the Royal Academy. He had ventured to show briefly that the Institute had realised the intentions of its founders, but there was still one point he must refer to—one condition which, through no fault of theirs, had not been fulfilled. Government after Government had succeeded during the sixty-six years of their existence, but had not supplied them with a place where they could hold their meetings, and deposit their collections. Their resources could be applied with increased advantage and greater force to the promotion of architecture, if an enlightened Government had seen its way to assist the Institute. In the name of the Royal Institute of British Architects and its allied societies he expressed to Sir Frederick Leighton their grateful acknowledgments of the graceful and kind way in which he had proposed the toast.

Mr. A. Waterhouse, R.A., proposed the toast of "The Visitors," which was responded to by Sir John Stainer, and the proceedings terminated.

#### INCORPORATED ASSOCIATION OF MUNICIPAL ENGINEERS.

THE twenty-first annual meeting of this Association was held in the Lecture-room of the Institution of Civil Engineers, Great George-street, Westminster, on the 21st ult. Last week we gave the greater part of the address of the President, Mr. A. M. Fowler, C.E., and we now return to the further proceedings of the Association.

Mr. T. Coddington read a paper "On some experiments with Model Wheels and Road Coatings," and after a short discussion,

Colonel Jones, V.C., read a paper on "The Development of Sanitation in America."

The problem of sewage disposal had, he said, been taken up by Americans in a much more theoretically scientific manner, and been less complicated by rival patentees than in England, where the public were always expecting that electricity or magic would some day conjure away our sewage difficulty. "The American engineers studied all that has been done in Europe, and satisfied themselves, as we have done, that whenever purification is demanded by local conditions it can only be obtained by intermittent filtration through land or its equivalent in a sand filter; but they could not help observing numerous imperfections in our practice, in pursuance of absolutely sound principles, and had to consider certain limitations to their application in their own country. For instance, there are four important factors in the American problem, viz:—(a) Colder climate; (b) Dilution of sewage—the water supply of American towns averaging eighty or more gallons per head of their population; (c) High wages for common labour; (d) The rapid rate of increase of population in the large towns; which all received very careful consideration. As regards (a), it may be noted that opponents of irrigation schemes in England often exaggerate the difficulty of dealing with sewage by that means in frosty weather, although it has been proved again and again that sewage never reaches the land much lower in temperature than 45 deg. F., and with reasonable care can be passed through a large area of land under cover of ice and snow during the hardest and longest frosts of our climate. But knowing that winters are much more severe in many parts of the United States it was desirable to examine very carefully what could be done, and as a result the American authorities have determined that it would not be desirable to resort to land treatment in districts where the monthly mean temperature falls below 20 deg. F. The author trusts, therefore, that English people will realise what a monthly mean of 20 deg. F.

means, and never again support anything so absurd as the frost objection regarding sewage farming in this country. The special conditions *b*, *c*, and *d* must govern the question in America, just as the high price of land does in England, and there is a general disposition to ask, "How little land can we do with?" although it is well known that under reasonable conditions both sanitary and financial requirements can be best satisfied by the devotion of a large area to sewage disposal in the way of broad irrigation. . . . The Massachusetts State Board of Health began in January, 1888, and are continuing to the present time, a most interesting course of extended laboratory experiments (with artificially-prepared filters up to 17 feet diameter, 6 feet deep), which has clearly elucidated the chemical and biological process which takes place while sewage is percolating through the pores of sand or soil, a process which we used to call oxidation, from its effect only, leaving the cause undetermined, though its source was recognised as air in the soil. And the carefully-kept records by these experiments amplify and confirm in the most satisfactory manner the earlier discoveries by Dr. Sorby, Warington and Percy Frankland, of nitrifying organisms working both in land and water. They have proved that intermittent filtration through sand or soil is not a process of straining at all, but is, on the contrary, a biological process in which the nitrifying organism, with the assistance of oxygen from the air and minerals naturally in solution in the sewage, resolves the organic matter of the sewage into soluble nitrates, and that as much as 100,000 gallons a day per acre may be passed through coarse mortar sand with the result of removing 98 per cent. of the albuminoid ammonia originally present in the sewage. The question of permanency of the filters, even with dilute American sewage, remains an open one, for the Report for 1892 refers to clogging, not only on the surface, which can be easily picked up, but in the body of the filter itself, and suggests caution in practical application of a table of quantities of sewage per day per acre, which had been put forward in the previous year's official Report. The clogging in lower parts of the filter is, however, attributed to the fact that the sand had been shovelled into the filter-bed while the latter was filled with water, and thus become stratified by the finer sand falling later than the coarser part of the material at the intervals of the filling operation. The layers of fine sand have intercepted particles of sewage which had passed through the coarser sand above, and thus become impervious, and it has been found that capillary attraction retains water in the lower part of a layer of fine sand which rests upon coarser material, and thus forms a water seal to prevent aeration of that part of the filter which lies below that stratum. The hope is expressed that stratification can be avoided in practice, and that with more moderate doses of sewage than those applied to the experimental filters, there may be less descent of particles below the surface, thus prolonging the life of filters in practical use. . . . Parallel with the filtration experiments above referred to another series has been devoted to chemical precipitation and simple deposition or "sedimentation," and results with lime, coppers, sulphate of alumina, separately and in combinations, are carefully recorded in many pages of the reports. But the total purification (indicated by the percentage of albuminoid ammonia in the raw sewage removed) in the best cases failed to reach 60 per cent., as compared with 98 per cent. removed by properly-conducted filtration through sand in the other series. Our judgment of practical trials has led us to much the same conclusion in this country, but we have never had access to records of such extent and authority as are supplied by the State of Massachusetts. It is beyond the scope of this paper to convey these data, but it is intended to urge a study of the original Reports and of a great work on "Sewage Disposal," by Messrs. Rafter & Baker, published by Van Nostrand, New York, and Sampson Low, Marston, & Co., London, 1894. This work, although compiled in America especially, will be found valuable to young engineers and sanitarians everywhere as a complete and reliable digest of the voluminous English blue-books and papers on sewage disposal which have been the study of a lifetime to engineers of the last generation, and it gives the latest American investigations all in one large volume."

Mr. Cooper (Wimbledon) considered it unfortunate that the filters spoken of by Colonel Jones were only experimental filters, not filters constructed in the best possible manner. The capillary attraction at the bottom of the filter

prevented that portion being aerated. Had larger stones been used and proper drainage that capillary attraction would have been got rid of and the air admitted to the bottom of the filter, which would lengthen its life. He did not believe in soil, and the growing of crops on the filter, as the soil very materially affected the amount of sewage which could pass through the filter.

Mr. White (Oxford) said the paper had very adroitly raised the whole question of sewage purification and utilisation. Colonel Jones had been very severe upon the chemical processes of sewage disposal, but as a strong advocate of irrigation he (Mr. White) was not disposed to quarrel with him on that account. He proposed a vote of thanks to Colonel Jones for his paper.

Mr. Hodson (Loughborough), who seconded the vote of thanks, said the great bugbear of sewage disposal was summed up by Colonel Jones in the words, "How little land can we do with?" That to his mind had caused more trouble and difficulty in connexion with sewage disposal than anything else. There were, of course, districts where but little land could be obtained, and where of necessity they must adopt chemical treatment; but wherever it was possible he was bound to say he was a strong adherent for treating sewage on land.

Mr. Mawbey (Leicester) said that their experience at Leicester had proved that the chemical system was absolutely out of the question. Up to three or four years ago the river was an abominable source of pollution, although they had tried every known chemical process. He had come to the conclusion from his experience at Leicester, that for final treatment of sewage there was nothing to equal land.

Mr. Escott (Halifax) said he agreed with land filtration where land could be obtained, but where land could not be obtained he believed that chemical treatment would turn out as bright an effluent, and at less cost.

Mr. Pritchard (Birmingham) while generally expressing himself in favour of land treatment, said that every town must be governed and controlled by its own local conditions.

Mr. Lemon (London) said he thoroughly agreed with what Colonel Jones had said respecting rival patentees. He congratulated American engineers that they were less troubled by rival patentees than engineers were in England. He agreed with Mr. Pritchard that they must adapt their systems to local circumstances. He was very sorry they should have a discussion on the relative merits of land filtration or chemical treatment. They were both right in their spheres. There were cases where it was absolutely impossible to obtain sufficient land for complete purification.

The President having briefly referred to the difficulties of Salford, and the system adopted at Manchester, said that engineers must adapt themselves to local circumstances in preparing schemes for sewage disposal.

The vote of thanks having been adopted,

Colonel Jones, in reply, said he quite agreed with the principle that particular rules could not be laid down for every place, but that each place must have its conditions attended to by the engineer recommending the scheme.

Mr. R. B. Sanders, King's County, then read a paper on "Irish County Surveyors."

A vote of thanks having been accorded, Mr. Sanders briefly replied.

Messrs. Parker, of Hereford, and Thomas, of Buckingham, were appointed auditors; and Messrs. Radford (Putney), Silcock (King's Lynn), and Pickering (Nuneaton), scrutineers. The various honorary district secretaries were unanimously re-elected.

The meeting then adjourned, and in the evening the annual dinner of the Association, a report of which we gave last week, was held.

The meeting of the Association was resumed at the Institution of Civil Engineers, Westminster, on the 22nd ult., Mr. A. M. Fowler presiding.

The Secretary (Mr. T. Cole) read a paper written by Mr. Laws, Newcastle, on arrangements for sterilizing cholera dejecta.

On the motion of Mr. Stainthorpe (Eston, Yorks) seconded by Mr. Mann (Sevenoaks) a vote of thanks was accorded to Mr. Laws for his paper, and it was agreed to discuss it at the first district meeting in the Northern Counties.

Mr. Swindlehurst (Burton), read a paper on "Maintenance of Main Roads in Urban Districts," from which we take the following extracts:—"It is scarcely possible within the limits of this paper to enter into the question as to what may be considered reasonable expenditure on urban roads under the various heads named. The subject is



much too wide and important to be dealt with briefly, and would demand separate consideration, for it is fully recognised that it is misleading and unsafe to dogmatise on matters of this kind. There are, however, two or three further points which it may be well to mention. **Footpaths.**—First in respect to footpaths. In several counties it is still the practice of the County Councils to altogether repudiate liability in respect to expenditure on footpaths. This fact is merely mentioned, as the question is purely a legal one, the law as it at present stands being clearly against this contention. Hence the Local Government Board awards all expenditure in respect to footpaths. **Improvements.**—Another important matter which more or less affects most urban authorities is the question of "reasonable improvements." This appears to be a particularly vexed question. By the term "improvements" the writer understands works which do not come within the ordinary term "maintenance and repair," as, for instance, alterations to the structure of the road surface, or any alteration in respect to the level or width of roadways or footpaths, the substitution of one class of paving for another, and works of a similar nature. It has evidently been the practice of the Local Government Board to award local authorities one-half the cost of "improvements," and in view of this fact the recent decision as to the rights of local authorities in respect to main roads assumes a very important aspect. The case referred to is that of *ex parte* the County Council of Wiltshire, and it was decided on January 26, 1894, by the Lord Chief Justice and Mr. Justice Day. It decided, in fact, that "the obligation of the County Council under Section 11—(2) and (3), is to repay to the Borough the actual cost (assuming it to be reasonably and properly incurred) of the maintenance, repair, and reasonable improvement of main roads during any year, whether such cost be normal or increased by reasonable improvements connected with maintenance and repair, and whether it be defrayed by the Borough out of current rates or by means of a loan." What effect this decision will have on future awards remains to be seen. **Management.**—A further point affecting the maintenance of main roads by urban authorities, and one which it is important to consider, as it frequently arises is the question of the *management* of the roads. Some people tell us that the only method of working main roads which can be satisfactory to the County Council is for the local authority to keep a separate and distinct staff of men and teams, with separate tools, plant, &c., for service *only* on the main roads, and it is insisted that unless this is done it is not possible for the local authorities to properly keep the expenditure on the main roads as distinct from other district roads. Now what would be the effect of this? It means that everything in connexion with the main roads must be kept for main road purposes simply. This system may be all very well on the rural roads, but for urban roads, often heavily trafficked, and passing through a busy town, it is very different. Many authorities have only a comparatively short length of main roads, and to carry out this system would entail much greater expense. Mr. Howard Smith, A.M.Inst.C.E., the City Surveyor of Carlisle, has recently issued a valuable tabulated statement of replies from eighty-one non-county boroughs where main roads exist. From this statement we find that gangs of scavengers are engaged *solely* on main roads in eight only of these places, whilst three only keep watering-vans *solely* for use on main roads. It will be seen from this that the almost universal practice is opposed to the keeping of a separate staff for main roads. The writer has the management of the whole of the roads within the borough of Burton-upon-Trent, the largest non-county borough in Staffordshire. There are 876 miles of main roads, and 2987 miles of other district roads within the borough. It was found necessary to appeal to arbitration in respect to the main road claim for the year ending 1891. As a result of this appeal the local authority was awarded 92 per cent. of the total amended claim, 99 per cent. of the claim originally rendered to the county, and which the authority was prepared to accept. Unfortunately it is found necessary to again appeal for two other years' expenditure, and this we are sorry to say seems to be the lot of at least seven other non-county boroughs of Staffordshire. The main roads in Burton are maintained by the same staff of men, and the same plant, &c., is used as on the other roads. The system is as follows:—

The borough is divided into districts: a road foreman has charge of the men engaged in a particular district. The workman *each night* gives to the foreman particulars of the time he has made, and where and how he has been employed; the foreman makes out a time-sheet *daily*, showing this information in respect to each labourer and team employed, and also what material has been used and for what purpose. Separate spaces are provided on the sheet, in which are entered in their proper columns the time and material expended on each main road. These sheets are inspected by the writer each morning, and then handed on to the wages and stock clerk, and after being checked and monied out by the clerk having charge of the main roads accounts, are entered in great detail in the main roads ledger, each class of work being kept in a separate column. The actual time made and material used on each main road is thus carefully kept each day, and the cost of the roads clearly shown day by day in the ledger kept for the purpose. This is mentioned thus fully to show the care which is taken to get a perfectly true and faithful record of the main road expenditure. In fact, the course adopted is to so conduct the whole operation of main road management in the district, not only in respect to the carrying out of the work, but also as to the supervision, the keeping of the accounts, and the preparation of the claim, always having in view the possibility of dispute, and recognising that the whole matter may have to be thrashed out before an impartial and severe critic. This will be found at once a safe and satisfactory method, and wherever it is adopted there need be little said as to the keeping of a separate staff on main roads.

Mr. Robinson (Hampshire), proposed a vote of thanks to Mr. Swindlehurst for his paper. Whatever the reason which had influenced the Legislature, the result had been that the counties had to provide the means for the maintenance of urban main roads. The county authorities had to consider the interest of their county ratepayers, and therefore must examine most critically the claims submitted to them by the urban authorities. To show how necessary this was, he mentioned that in Hampshire the expenditure on urban roads had been doubled since the passing of the Local Government Act.

Mr. Lobley (Hanley), who spoke from an independent position, as the representative of a county borough, suggested that the present arrangements should be altered, and that the contribution from the county to the local authority should be the proportion of the county rate that the ratepayers in the urban district paid.

Mr. Davis, County Surveyor of Shropshire, believed that agreements might be largely effected by an interchange of views between county and urban surveyors.

Mr. Lowe (Hampstead) mentioned that for two disturnished roads for which the Hampstead Vestry offered to accept 1,900*l.* a year the sum of 2,137*l.* was awarded on arbitration.

Mr. Codrington, Local Government Board Inspector, said that if authorities would agree to the suggestion of Mr. Lobley, it would be a very good basis to work upon.

Mr. Weaver (Kensington) expressed the opinion that the grants to local authorities should be made on the basis of country roads, and not of town streets.

Mr. Hodson (Loughborough) considered that the position of this question had been entirely changed by the recent Parish Councils Act. He thought each district should have the maintenance of its own roads, and the grant in aid allotted every four or five years by arbitration on their ratable value.

Mr. Ruck (Kent) stated that the cost of roads in his county was 407*l.* a mile.

The vote of thanks having been accorded, Mr. Swindlehurst briefly responded.

Mr. Shoobred (London) read a paper giving the results of four years' working of the Corporation electricity supply at Bradford. The whole of the working costs and sinking fund charges had been met, and a profit exceeding 2,000*l.* paid over to the aid of the rates.

Mr. R. Hammond (London) read a paper on "Electrical Traction."

Mr. Crompton (London) congratulated Mr. Shoobred on the successful working of the Bradford system, which he attributed to the adoption of the low-pressure continuous system.

Mr. R. Hammond said the object of his paper was to show that there was a power in electricity works which could be usefully and profitably used for electric traction.

A vote of thanks accorded to the authors for

their papers, and a vote of thanks to the Institution of Civil Engineers for the use of their rooms, closed the business portion of the proceedings.

The members then proceeded to the Mansion House, where they were received and entertained by the Lord Mayor. His Lordship, in welcoming the members, expressed his sense of the great work in sanitation performed by Municipal Engineers. From the Mansion House the members proceeded to the Limmer Asphalt Works, where they were shown the process of manufacture.

Rock asphalt, it was stated, is a natural product—a limestone rock impregnated with bitumen—and is found in Limmer and Vorwohle in Germany, in Switzerland, France, and Sicily. For compressed work this company's supplies are taken from Ragusa in Sicily, and for mastic work from Germany. It is quarried in the same manner as other minerals, and brought to England in its natural state. The process of manufacture of compressed asphalt for carriageways, &c., is as follows:—The pieces of raw rock, weighing from  $\frac{1}{2}$  to  $\frac{3}{4}$  cwt., are placed into the "crusher," where they get broken to the size of walnuts. After passing through the crusher the asphalt is carried up by elevators to the disintegrator, which runs at a speed of 1,800 revolutions to the minute, where it is ground to a fine powder. For compressed work this powder is heated in roasters with revolving cylinders to a temperature of about 280 deg. Fah., and as soon as the superfluous moisture has evaporated the heated powder is placed in iron sheathed vans, covered with cloths and taken to the street where it is to be laid. The powder is then raked over the surface of the street to the thickness required and rammed with hot pelons, smoothed to a polished surface and then rolled with a heavy hand-roller. It gradually becomes cold, and in time is compressed into solid rock again by the traffic. The usual thicknesses of compressed asphalt are as follows:—

Carriageways (heavy traffic) ...	2 in.
" (light " ) ...	1 $\frac{1}{2}$ "
Laid on a bed of 6 in. of Portland cement concrete.	
Footways ...	1 in.
On a bed of 3 in. to 4 in. of Portland cement concrete.	

Mastic asphalt is manufactured in the same way as the compressed as far as the powder stage, then it is boiled in cauldrons worked by agitators with a certain quantity of bitumen as flux, and when heated to about 400 deg. Fah. a proportion of from 10 to 20 per cent. of fine Bridport grit is added, and thoroughly incorporated with the asphalt by the agitators, it is then turned into iron moulds and made into cakes of  $\frac{1}{2}$  cwt. each ready to be sent to any part of the world. These cakes are broken up, put into cauldrons with just sufficient bitumen as a flux, and when properly cooked the asphalt is spread over the surface to be covered by means of hand floats, and then rubbed with fine sand.

A visit to the Australian meat stores of Messrs. Nelson Bros., Limited, at Lambeth, closed the day's visits.

On the 23rd ult. the members had a river trip on a steamer kindly provided by the President (Mr. Fowler), proceeding from the Temple Pier to Richmond, where they inspected the new footbridge and weir, and then proceeding to the sewage works at Teddington, where the process of sewage disposal was explained by Mr. York, the local Engineer.

THE LONDON COUNTY COUNCIL AND FREE LABOUR.—A deputation of representatives of the National Free Labour Association waited upon the Works Committee of the London County Council on the 25th ult. respecting the employment of non-union labour by the Council. The object of the deputation, whose views were stated by Messrs. W. Collison, secretary, and F. J. Rogers, treasurer of the association, was to combat the statement of the Council that it did not display partiality in the employment of labour. A number of witnesses were brought to prove to the committee that they had been refused employment during the last eighteen months because they did not possess the Building Trades' Federation ticket. The result was that, having heard the statements, the Committee promised to make every inquiry into the matter, and to thoroughly investigate it.

RUTTY'S ROAD SCARIFIER.—This machine for breaking up Macadam roads, previously to relaying, which we noticed and described some little time ago, has just been successfully tried at West Hampstead. The scarifier is drawn in the train of a traction engine or steam roller.





DESIGN FOR A FRIEZE BY M. ALLEN LAMBERT







## THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, Sir John Hutton occupying the chair.

**A New Asylum.**—The Asylums Committee reported that the purchase of the portion of Baldwyn's Estate, Bexley, Kent, as a site for a new asylum, was completed on April 10 last. They now proposed, in accordance with the powers conferred on them by Section 254 of the Lunacy Act, 1890, subject to the Council authorising them, under Section 239, to provide the asylum, to obtain, by public advertisement, plans and estimates for the erection of an asylum for 2,000 patients, and to duly submit for the approval of the Council the design selected. Certain preliminary expenditure would have to be incurred for obtaining plans, advertising, printing, and other incidentals. They accordingly recommended—"That, in accordance with section 239 of the Lunacy Act, 1890, we be now authorised to provide the sixth asylum, and, subject to the usual estimate being submitted to the Council by the Finance Committee, to incur a preliminary expenditure of 2,000*l*."

Mr. McDougall proposed as an amendment the addition of the following words to the recommendation:—"And that it be an instruction to the Asylums Committee that the cost (exclusive of site and furnishing), must not exceed 350,000*l*., and that they do engage an architect, to be paid by salary, and the necessary assistants, to prepare the plans and supervise the erection of the proposed asylum."

Mr. Beachcroft seconded the amendment.

Mr. Strong, the Chairman of the Committee, said that Mr. McDougall's idea of engaging the services of a clever young man, and of giving him instructions what to do, was an idea which would be attended with some risk and danger. The Committee had decided that in the event of the resolution being agreed to premiums of 300*l*., 200*l*., and 100*l*. should be paid to the first three architects respectively so placed by an assessor, but that the assessor should not be appointed until after the plans had been sent in, in order to insure against competing architects designing in accordance with views known to be possessed by the assessor. They also proposed, instead of giving the usual commission to the successful architect, to set aside the sum of 10,000*l*. for architects' work in connexion with the asylum. That sum would include everything except quantities.

Mr. Nathan Robinson supported the recommendation of the Committee, and regretted that Mr. McDougall had, after being defeated in Committee, thought fit to move his amendment.

Mr. Roberts said that there were only one or two possible assessors in the matter of lunatic asylums, and the result was that a competition for such a building was confined to a select ring of specialists. He advocated the proposed departure, which was not new, for the London School Board, after trying the competitive system, had adopted a similar arrangement. The Council already had its own architect and engineer, and they ought to have an architect for their asylums.

Dr. Cooper, in supporting the amendment, said he regretted that the Committee should have gone in the face of medical opinion in asking the Council to erect an asylum for 2,000 people. The Lunacy Commissioners were totally opposed to such huge asylums, for it was impossible to properly treat the disease from a medical point of view where the patients were congregated together in such large numbers.

Mr. Emden heartily supported the recommendation of the Committee, and said that when they were spending 300,000*l*. or 400,000*l*. it was absolutely necessary that they should have the best advice that they could possibly obtain, and employ the most experienced man they could find.

Mr. Westcott thought the committee should take the report back and bring up a fresh one, in which they should say definitely whether they thought the asylum should be built on the "block" or the "villa" system.

On a show of hands, the amendment was carried by 31 votes to 24, and upon a division there were—for the amendment, 57; against, 35.

Mr. P. M. Martineau then moved to omit all the words after "do engage an," and substitute the following: "experienced architect, to prepare plans and supervise the erection of the proposed asylum, who shall be paid for his services by a fee, and that it be referred to the Committee to consider whether 10,000*l*. would not be a proper fee."

Mr. Antrobus seconded the amendment, which, on a show of hands, was negatived.

Mr. Campbell moved to refer the matter back. He quite sympathised with the desire the Council had shown to alter the present "block" system of dealing with lunatics, and he therefore thought it desirable that the matter should be thoroughly reconsidered.

Mr. Lloyd seconded the reference back, which was defeated.

Mr. Pearce moved that "300,000*l*." be substituted for "350,000*l*." in the words introduced on the motion by Mr. McDougall.

This substitution was approved, and the recommendation, as amended, was then adopted in a substantive form.

**Regent's Canal.**—The Public Health and Housing Committee in regard to the Regent's and Grand Junction Canals reported that they had addressed a communication to the sanitary authorities through whose districts the Regent's and Grand Junction Canals passed, enquiring what action had been taken since the conference in December last, whether any mud deposits had been removed from the canals, and whether the surface of the water was periodically or regularly scavenged. They had also asked the Vestries of St. Marylebone and St. Pancras what steps had been taken for diverting the drainage of the Zoological Gardens from the Regent's Canal.

Mr. Lloyd regretted that the Committee had not taken more effective action, and moved that the paragraph be not received.

Dr. Collins seconded the motion, which was agreed to.

**Proposed Purchase of the Water Companies.**—The Water Committee reported as follows:—

"We submitted at the last meeting two resolutions with regard to the introduction of a Bill or Bills for the transfer to the Council on the lines of the resolution of the Council of February 27, 1894, of the undertakings of the Metropolitan Water Companies, or of such one or more of them as the Council might hereafter determine, and for the preparation of such Bill or Bills by the Water Committee, in conjunction with the Parliamentary Committee. Since the report was agreed to we have had the opportunity of further considering the subject, and we have come to the conclusion that it will be better to go to Parliament for powers to acquire the properties of all the companies, but to proceed by means of a separate Bill for each company. With regard to the mode of preparing the Bills it is clear, having regard to the terms of the Council's reference to the Parliamentary Committee, that, instead of authorising us to prepare the Bill or Bills, it will be the proper course to associate a few of our members with the Parliamentary Committee in the matter. This course was adopted last year in regard to the London Streets and Buildings Bill, and we accordingly recommend—(a) That eight separate Bills be prepared for the acquisition by the Council of the undertakings of the eight Metropolitan Water Companies; (b) That it be an instruction to the Parliamentary Committee, in conjunction with three members of the Water Committee, to prepare the Bills, with a view to their introduction in the next Session of Parliament."

The recommendations were agreed to, and the Council adjourned shortly after half-past seven.

**OLYMPIC MUSIC HALL.**—By an order of Mr. Justice Stirling in the cause *Wilmot v. Olympic Music Hall* and others, the sale by auction of this property was fixed for the 20th ulto. It is held on lease for a term of fifty-five and a half years still unexpired at an annual rent rising to a maximum of 3,000*l*., and covering a total area of 14,000 ft. superficial, comprises an auditorium with room for 3,000 persons, and a stage which is claimed to be, in size, second to only that of Drury-lane playhouse. A company of proprietors was formed in March of last year to convert into a music-hall the New Olympic Theatre, built four years ago by Messrs. Holliday & Greenwood, after the designs and plans of Messrs. Crewe & Sprague, of Fitzalan House, Arundel-street, W.C., who made also some further alterations, with re-decoration, &c., last autumn, for which Messrs. George Veale & Co.'s contract of 2,350*l*. had been accepted. For an account of the new house see the *Builder* of December 13, 1890; and a notice of the old theatre's history in our columns of July 13, 1889.

**PROJECTED TUNNEL UNDER THE GREAT BELT.**—Danish engineers are completing plans of a project for the construction of a tunnel under the Great Belt and a bridge over the Little Belt, whereby direct communication would be established between Copenhagen and the rest of the Continent all the year round. The tunnel would also be of great advantage to Sweden and Norway. The estimated length of the tunnel is eighteen kilometres, and the soil is said to offer no engineering difficulties. The cost of the tunnel is estimated at 1,112,000*l*., and that of the bridge at 700,000*l*.

## Illustrations.

## DESIGN FOR A FRIEZE.

**HIS** design, by Mr. Arthur Gwatkyn, forms the largest exhibit in the Architectural Room at the Royal Academy. The leading colours in the original are brown, olive, and purple, blending, however, into intermediate tints which cannot be precisely defined.

The forms employed are based on the foliage of the fig-tree, and the lines are intentionally designed on the basis of the square or "key" form, not on that of the scroll.

The frame was specially designed by Mr. Pite.

## RIEVAULX ABBEY, YORKSHIRE.\*

ALTHOUGH Rievaulx Abbey† cannot compare with Fountains in the extent and preservation of its remains, or with Kirkstall, Tintern, and other monasteries, in the ease with which its remains may be studied, it certainly carries off the palm for the extreme beauty of its situation and surroundings. Most completely, too, does it conform to the Cistercian rule that the houses of the Order were to be *in locis a conversatione hominum remotis*, for even now, with the exception of a few later cottages, the nearest place to it is the little market town of Helmsley, three miles away.

According to the popular story, Rievaulx was founded in 1131, as well as Kirkham in 1122 and Warden in 1136, by Walter Espec, in memory of his only son, who was killed when riding. That the Abbey was founded by Espec about 1131 is true enough, but the foundation charter says nothing about his only son, and there is no proof that he ever had a son. The Abbey was founded for monks of the Cistercian Order, and colonised direct from Clairvaux. The site is in a narrow valley, through which flows the river Rye, on a plateau of high ground at the foot of a steep hill, on the top of which is the famous "Terrace." Owing to the circumscribed nature of the site, the abbey church was placed parallel with the hill, with the result that its axis lies almost north and south, instead of east and west. It will, however, be more convenient to speak of the conventional points of the compass in describing the Abbey. The cloister and monastic buildings lay to the south of the church.

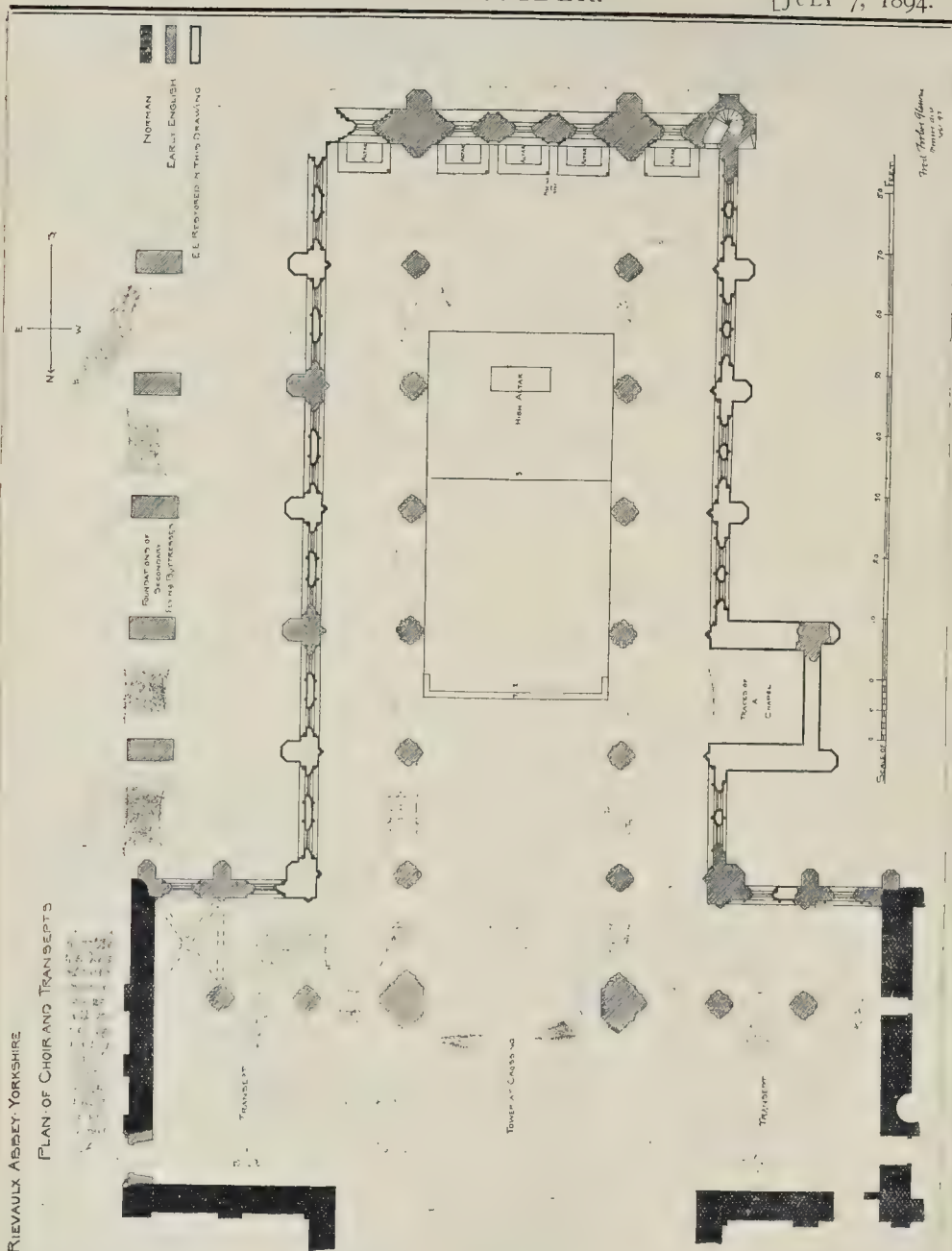
The first buildings set up on the site were doubtless of wood, after the Cistercian manner, for it was a rule of the Order that no new colony should be established "until the place be furnished with books, buildings, and necessities," the buildings being specified as the church (*oratorium*), frater (*refectorium*), dorter (*dormitorium*), guest house (*cella hospitalium*), and porter's lodge (*cella portarii*). We have an exceedingly curious piece of evidence that the first buildings at Rievaulx were of a temporary nature only, in the deeds relating to the construction of a *galleria*, or canal, for bringing stone to the Abbey from the quarry. The date of these charters is about 1,145, more than thirteen years after the foundation, and the canal to which they refer, the remains of the dam to divert and regulate the waters of Rye, and the quarry itself, are still visible to the west of the Abbey buildings. With the stone of this particular quarry the first church was built, as may be seen in the existing transepts and what is left of the nave. If I remember rightly, portions of the eastern and western ranges of buildings, which would naturally follow the church, are built of the same stone.

The history of the Abbey between its foundation and its fall is practically a blank. It was surrendered by the abbot and twenty-two monks (twenty-one of whom were priests and one a sub-deacon) on December 3, 1538, and on March 18 following the site and all the buildings were granted by letters patent to Thomas, Earl of Rutland. The clear annual value at the surrender was 278*l*., or about 5,500*l*. of our money. From a survey of the buildings, made probably under the Earl's direction and preserved at Belvoir, we

\* The series of the "Abbeys of Great Britain" is resumed this month with illustrations of (No. 11.) "Rievaulx" (No. 1.) "Westminster" was given in our New Year number, January 6, 1894. Particulars of this and of the three Cathedral series ("England and Wales," "Scotland," and "Ireland") will be found on p. 1 of wrapper.

† We much regret that, owing to an accident at the lithographers, for which no one was to blame, we are unable to give the view of the remains of Rievaulx, which should have been published in this issue. It will be given in the number for August 4, along with the illustrations of Glastonbury to be published in that number.





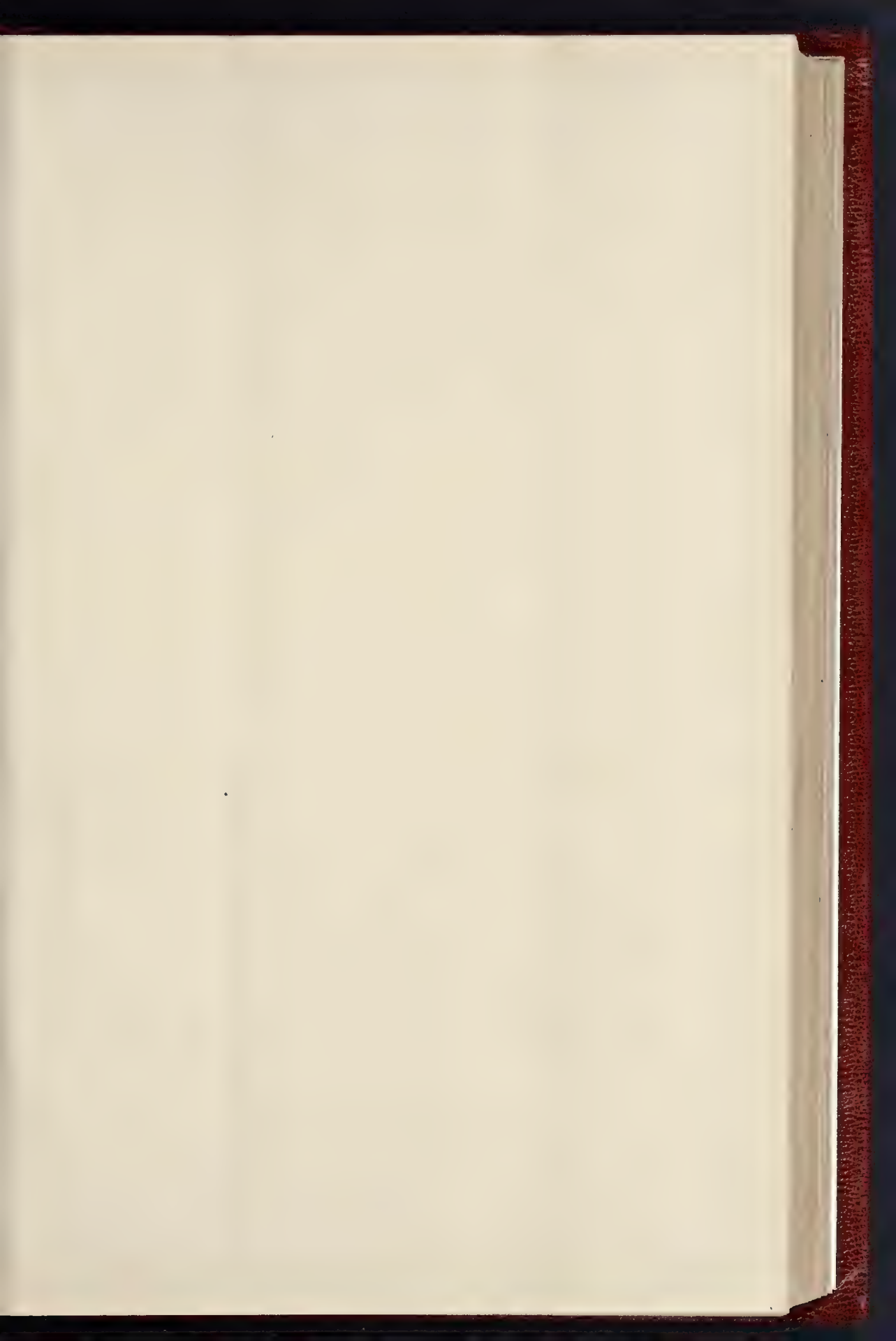
learn much valuable information as to their condition, their furniture, and the uses to which they were put. These particulars will be more conveniently discussed with the account of the buildings.

Although nothing else is left of the first church than the ends and west sides of the transepts, and part of the south wall of the nave, its plan and arrangements can easily be made out. The eastern sides of the transept and the presbytery have been rebuilt, but there is little doubt that their plan resembled that of Kirkstall, an aisleless presbytery of two bays, flanked by three chapels on each side, opening out of the transept and separated by walls. The nave was nine bays

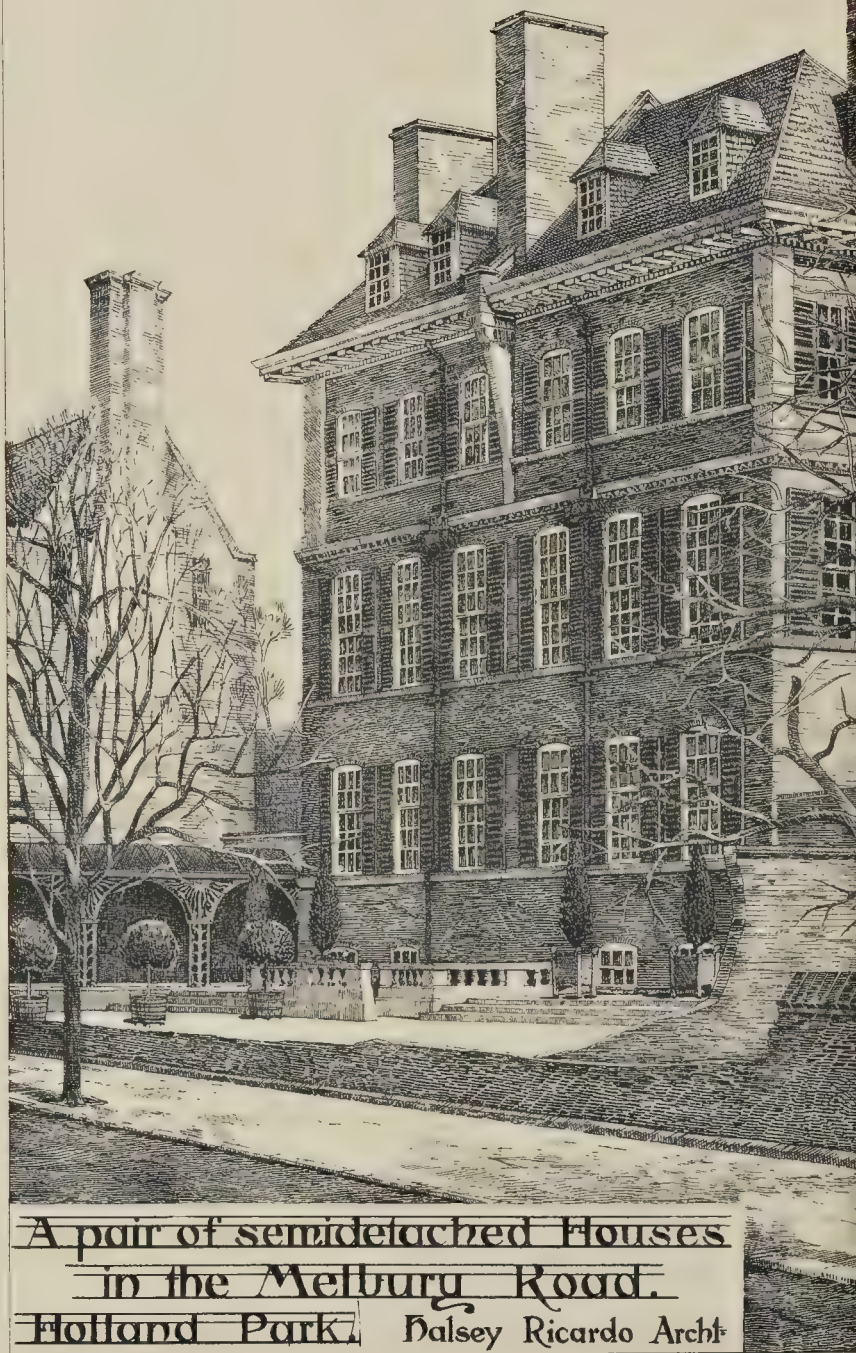
long. The monks' choir occupied the crossing and, perhaps, two bays of the nave, and a third bay formed the retro-choir. The rest of the nave was the choir of the *conversi*, or working brothers. The aisles were shut off by continuous walls, against which the stalls of the *conversi* stood; but long before the suppression the *conversi* had died out, their choir had been cleared away, and the aisles cut up into chapels, four on the north and two on the south side. The fortunate incorporation of much of the old work when the transepts were rebuilt enables us to see that the architecture was of the severest possible type, with the plainest of round-headed windows and the simplest of string-courses, as in

the corresponding work at Fountains. The nave, perhaps, retained its Norman character to the end, for the Survey speaks of the "selyng of the roof painted" (perhaps like that at Peterborough), and of a clearstory of "xviii. lights of square stone." The west window seems to have been one of many lights, probably a Perpendicular insertion, for the Survey directs the stone, iron, and glass "to be taken down safely . . . and to be bestowed in Helmsley Castell, and the charge of takyng down thereof is iij li. xiiis. iiijd." At the west end of the nave was a porch or Galilee, extending the width of the front, as at Fountains and Byland, described in the Survey as "the house or portche at the west end of the Church."









A pair of semidetached Houses  
in the Melbury Road.  
Holland Park. Halsey Ricardo Arch<sup>t</sup>



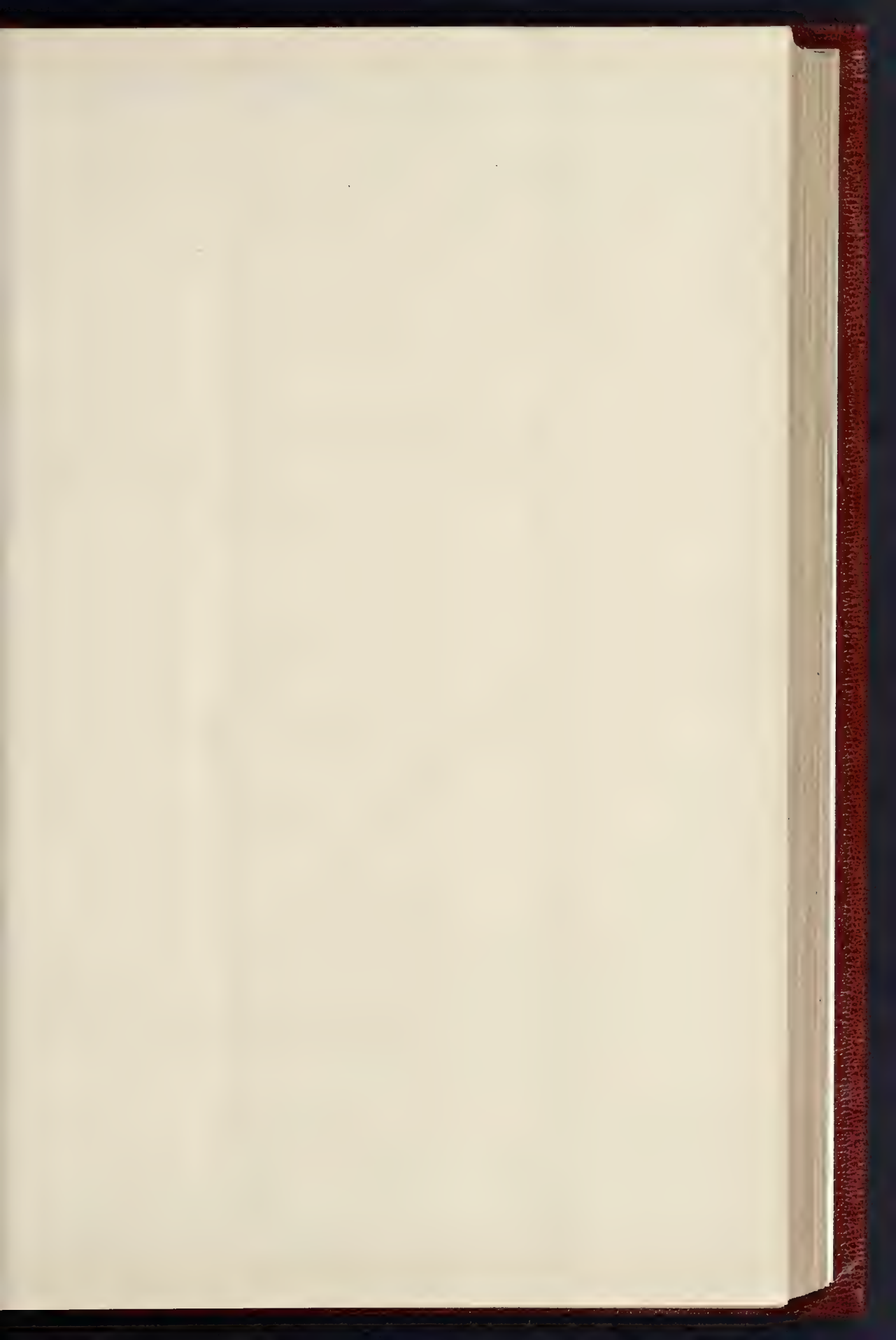


PHOTO LITHO. SPRAGUE & CO. 45 EAST MADISON STREET, PEPPER LANE, E.C.





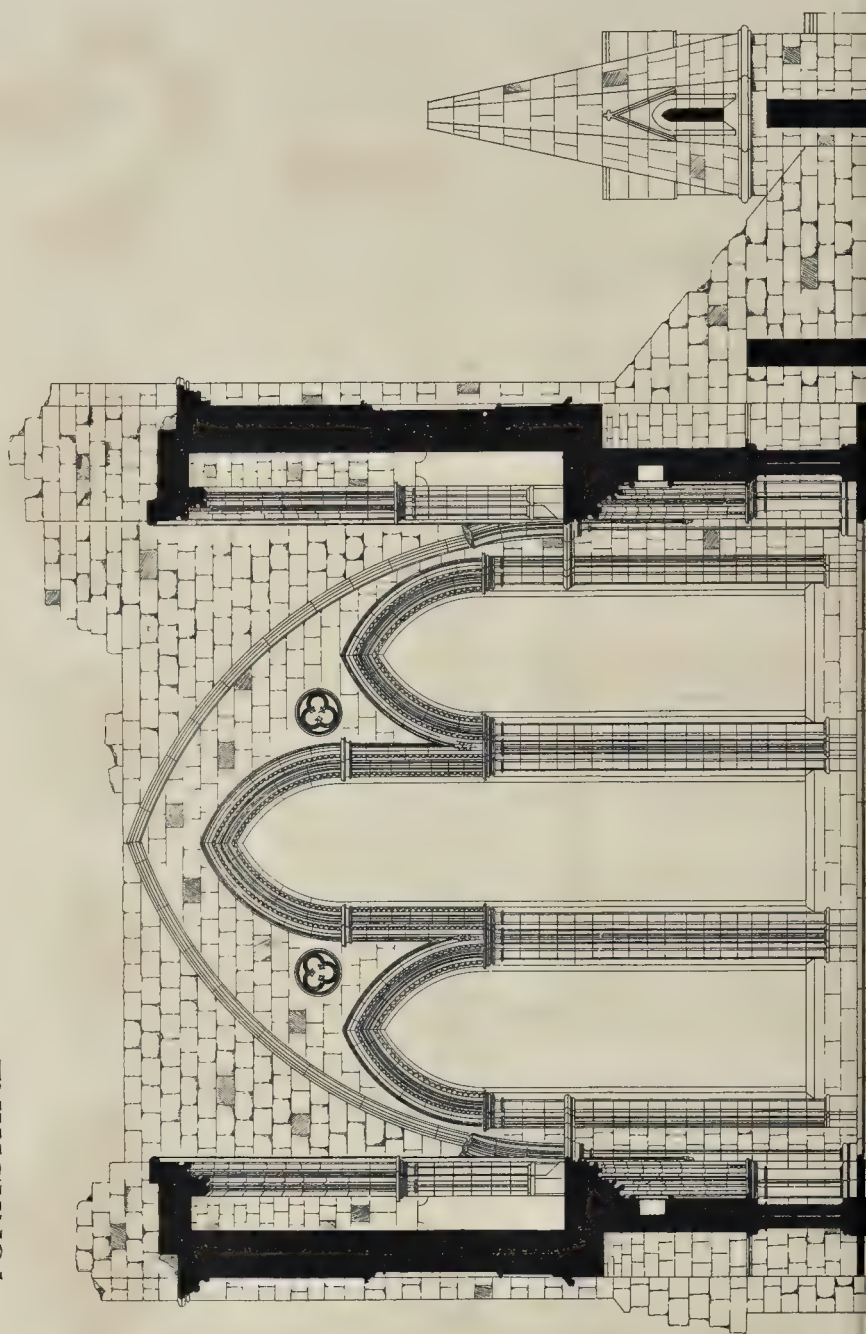




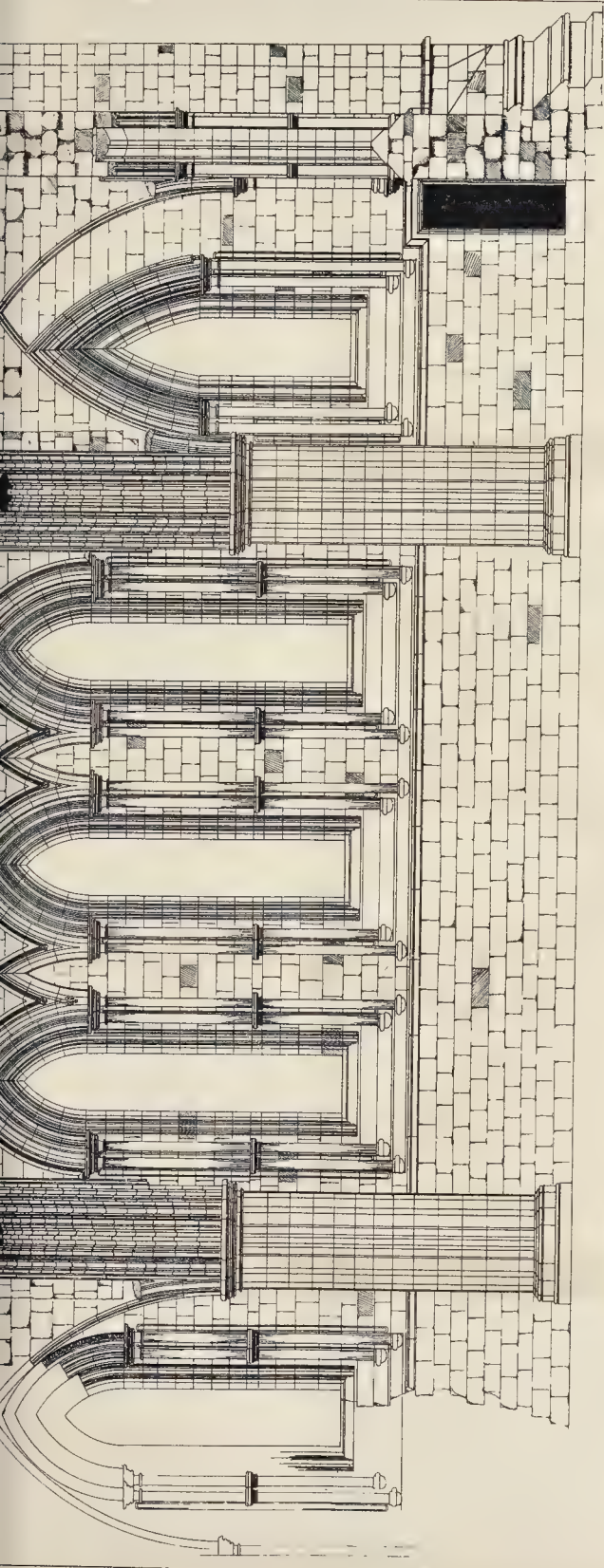


THE BUILDER, JULY 7, 1894.

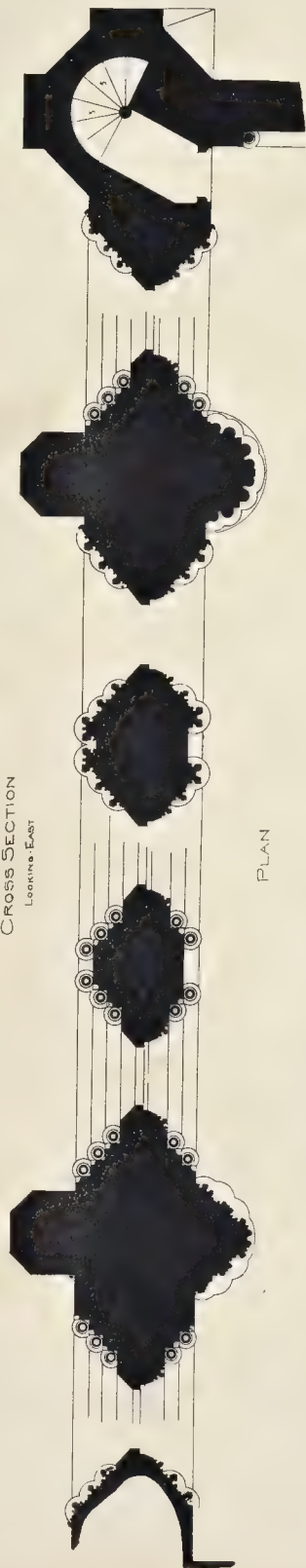
# RIEVAULX ABBEY YORKSHIRE







CROSS SECTION  
Looking East



PLAN

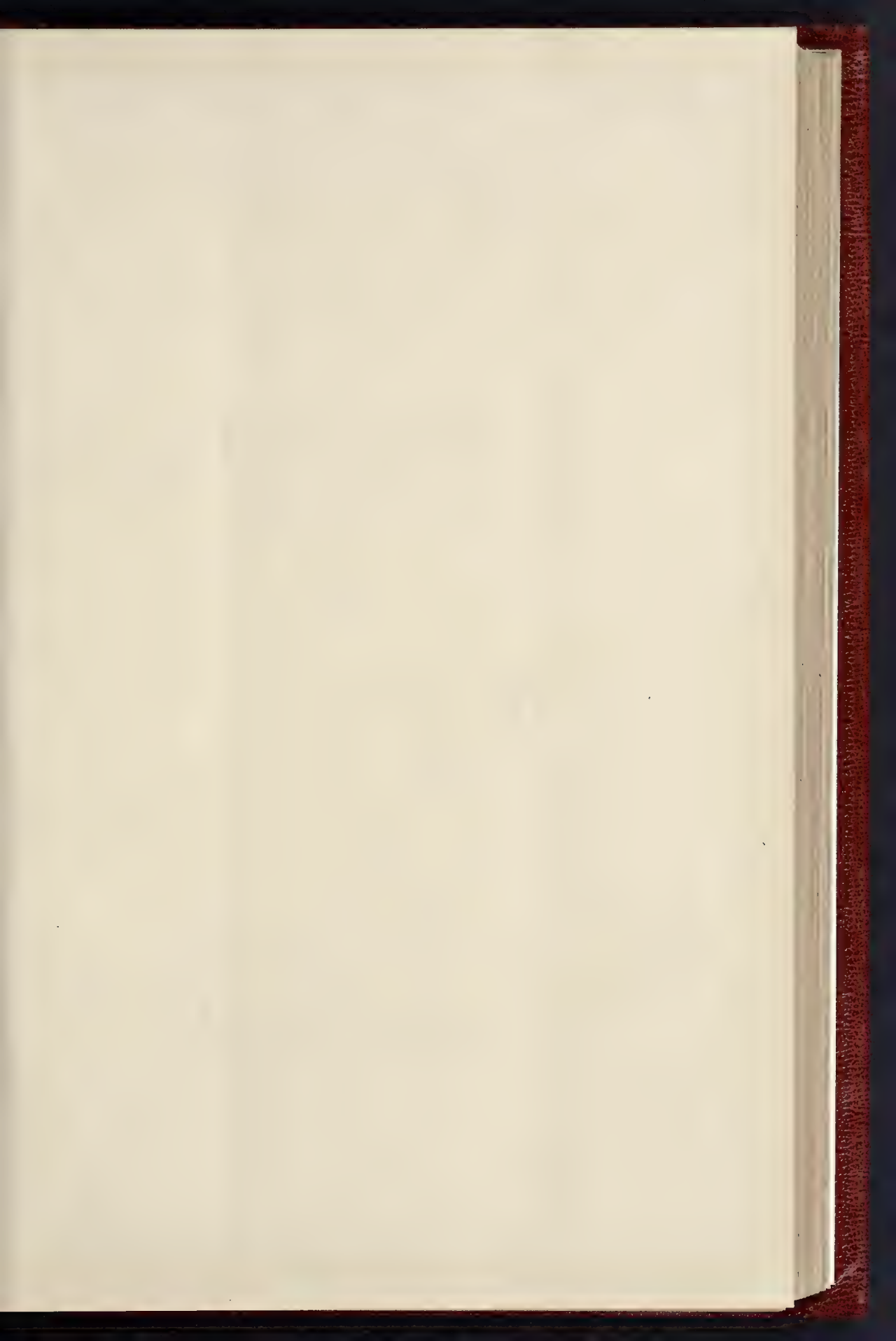
SCALE OF FEET  
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

THE ABBEYS OF GREAT BRITAIN.—No. 2. RIEVAULX.

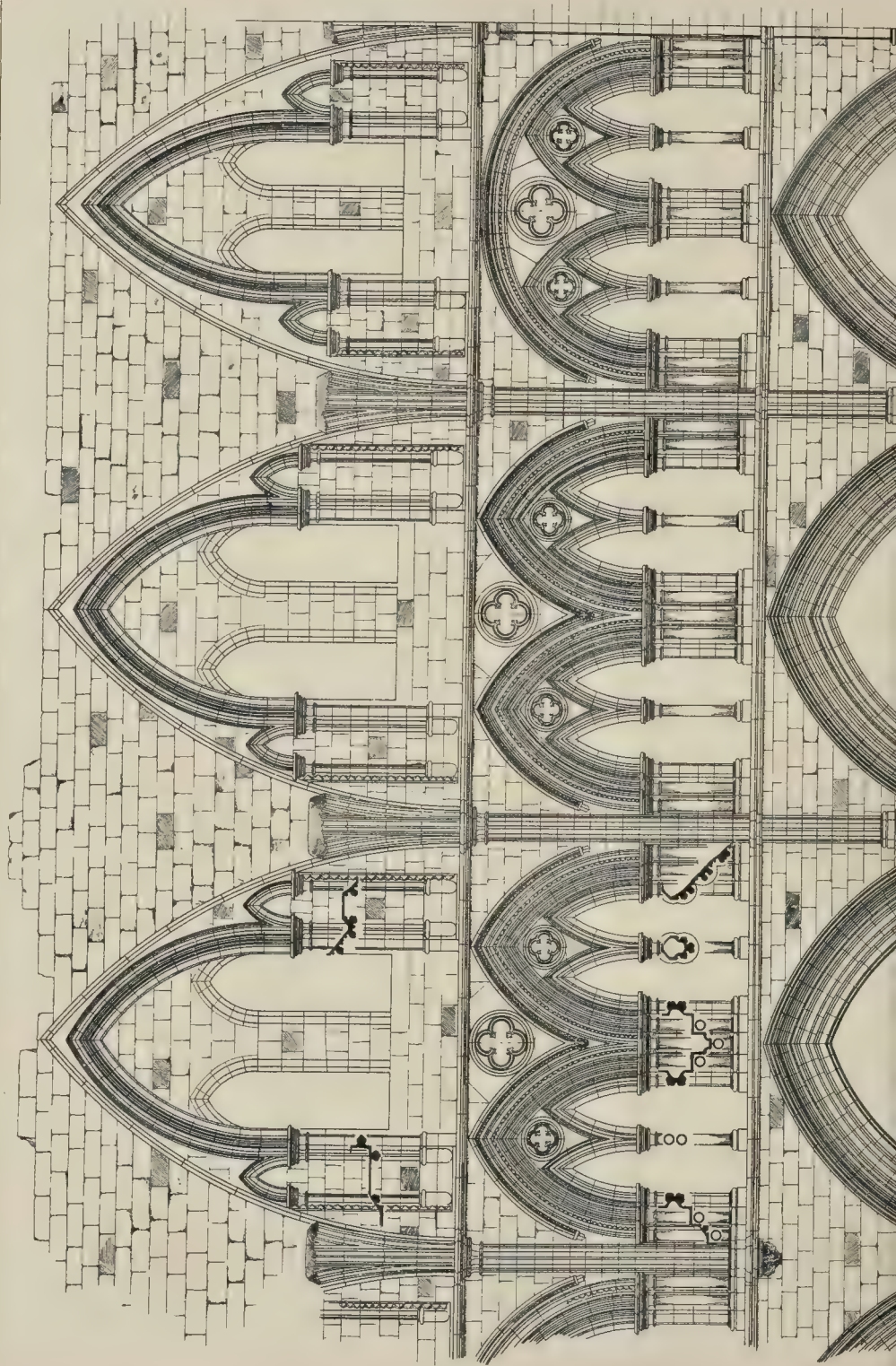
SECTION OF CHOIR AND INTERIOR ELEVATION OF EAST END—MEASURED AND DRAWN BY MR. F. F. GLENNIE.



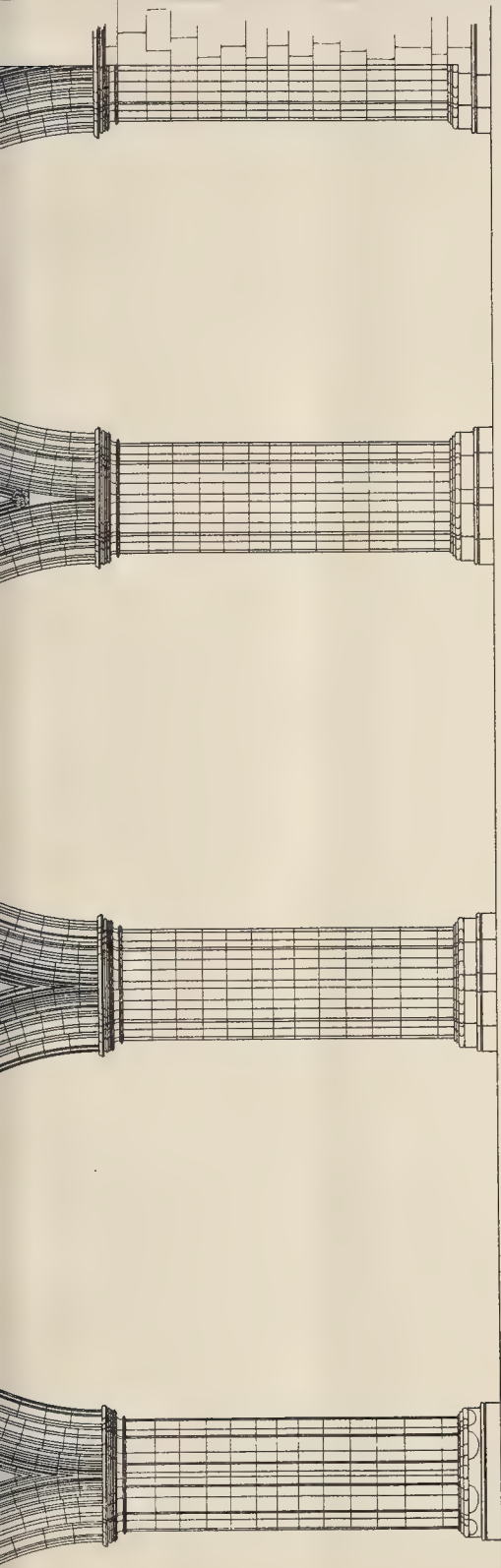




THE BUILDER, JULY 7 1894.

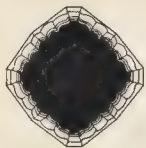
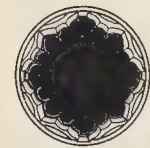




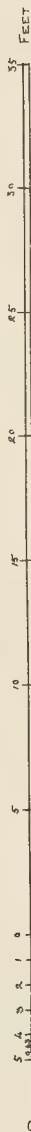


ELEVATION  
OF  
THREE BAYS NEXT TO CROSSING

Note. There are no detached spots left in  
any part of the building



PLAN



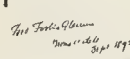
Sped. Spec. Plans  
House of the  
St. Jul. 1892

THREE BAYS NEXT TO CROSSING. ELEVATION. SCALE OF 1/4\"/>

THE ABBEYS OF GREAT BRITAIN.—No. 2. RIEVAUX.  
THREE BAYS OF CHOIR.—MEASURED AND DRAWN BY MR. F. F. GLENNIE







In place of the old aisleless presbytery of two bays, the new work, which has fortunately come to us in a singularly complete state, is seven bays long, with north and south aisles. It also includes a new story to the west side and the ends of the transepts, and the rebuilding of the range of chapels east of them. On the south side of the fifth bay of the new work there is attached to the

aisle a vestry, as at Selby and St. Mary's Abbey, York.

A careful examination of the work shows in what order it was built, and throws light on the plan of the earlier church.

The first part undertaken seems to have been the north transept. On its east side was built a new arcade of three arches opening into two new chapels and the north choir aisle. The triforium above has in each bay a double opening with pointed heads, with a sunk quatrefoil between, and the clearstory a single pointed window. On the west side, the clearstory forms an additional story to the Norman work. In the north wall a large triplet of lancets replaces the Norman windows.

It should be noticed that the vaulting shafts of the new work are corbelled off on the east side of the north transept just below the triforium level. This same feature is seen in the four first bays of the eastern arm, but not in the two next the crossing. In these the shafts are brought down and corbelled off just above the springing of the arches. The same arrangement also occurs in the south transept. Further examination will show that the section of the piers in the two bays next the crossing is different from the piers east of them, and there is also a marked difference in the arch mouldings, the western arches being of later date. Clearly, then, the eastern part was built first, so as not to interfere with the use of the old Norman presbytery, and when sufficiently complete to allow the services to be held in it, the old presbytery was taken down and the new work joined to the transept. The interval that elapsed before this was done is plainly shown in the modified design of the two last bays. We are enabled further to learn from this piece of architectural history that the old presbytery was only two bays long.

With the exception of the variation in the length of the vaulting shafts, the new work is of uniform design throughout. The beauty of the arcade depends entirely upon its arch mouldings and clustered piers. The triforium, as shown in Mr. Glennie's drawing, consists of two richly-moulded arches, both subdivided, with a sunk quatrefoil between; but in the last bay, which is narrower, the label is carried over so as to enclose both arches. The clearstory contains on the inside a tall pointed arch with sunk panels at the side, and externally a pair of lancets enriched with the dog-tooth ornament. The design of the east end is excellently shown in Mr. Glennie's drawing, but the bases of the triplet in the gable do not appear within. The south transept was the last work. In design it resembles the north transept, but the vaulting shafts are brought down lower, and the clearstory has in each bay three tall openings enriched with the dog-tooth ornament up the jambs.

Concerning the divisions and arrangements of the new eastern limb, many interesting facts can be made out from the building itself, aided by the Survey.

On the completion of the work the monks' choir was moved into the two westernmost bays, the stalls being returned against a stone *pulpitum* or loft under the east arch of the crossing. To accommodate this screen the piers of the arch are boldly corbelled off at some height from the floor, and higher up still are the holes for the beam for the rood and St. Mary and St. John. The crossing in turn now became the retro-choir, and was cut off from the nave by a screen described in the survey as "the perclose overthwart the body." The nave aisles were also shut off by screens, as may be seen from the holes for them; and there are marks of screens in the arch into the south choir aisle, and high up, in each of the arches on the east of the north transept. In the south transept was, as usual, a "clokehouse and a clok therin complete." Against one of the piers on the east side are plain marks where there was "an image of Saynt Cristofer in a tabernacle sett betwene both this ii. chapells." The Survey further says of the "south crossalle," "a rofe all to brokyn with falling of the steeple," and so we learn the fate of the tower over the crossing.

Between the arches of the new work, and extending for five bays from the tower, was the usual stone wall or screen. It was returned across behind the high altar, which stood in the third bay, and was, clear of the stalls, arched above its front. Between the fourth and fifth piers is the *gradus chori*, and immediately to the west of it, the "upper entrances" from the aisles. The choir and presbytery, therefore, each occupied two bays and a half of the new work.

The high altar, the site of which is marked by its huge and thick covering slab, had "tables

of wood before the altar, and above the altar gylde," together with "x images gylde," and there was "a loft of tymber on the bakside of the of the high altar with a sele under hit all of wood." The marks of this are visible on the piers, and on the north side are other marks, where stood "an image of Our Lady gylde."

The second bay, that behind the high altar, was open for processions.

The first bay, and the ends of the two aisles, contained against the east wall a row of five little chapels. These were divided from each other by stone walls 9 ft. long and 1 ft. thick, which were continued in wood to meet "a faire parclose at the east end of the church, extending from the one syde of the church to the other," which partitioned "the fyve alters above rehersed." This parclose stood on a broad platform, two steps high, which crossed the church on the east side of the first pair of piers. Each altar stood on one step, with a floor-drain immediately below. Four of the altars had painted "tables" for reredoses, but the altar of St. John Baptist had "an altar table of alabaster on the altar." The pin-holes for fixing these tables are plainly visible on the east wall.

Without a plan, and in the overgrown and buried condition of the ruins it is very difficult to make a plan, it is not worth while to attempt to describe the monastic buildings. The arrangement is fairly normal, but the *cellarium* on the west side of the cloister which usually contained the frater and dorter of the *conventi*, is here represented by a mere "garage," as the survey calls it. The frater was a fine hall built at right angles to the south side of the cloister, between the warming-house on the east and the kitchen on the west, but owing to the great drop in the ground, it is run out over a vaulted undercroft. On the east, next the church, was a vestry, and a lobby at the foot of the night-stair to the dorter, which is curiously contained in the gable. Then came the Chapter House, a noble room divided by four rows of columns into five alleys, with a large apse, of the width of three alleys, at the east end. Still further south were the parlour, a passage to the infirmary, and a large vaulted undercroft. Above all these, and extending over the Chapter House up to the church, was the monks' dorter. East of this was the infirmary cloister, with the *domus necessaria* on the south, and the farmery hall and its appendages on the east, but by the Suppression this seems to have been appropriated by the abbot as his lodging.

The conduit from whence the water was distributed by lead pipes throughout the Abbey is still running. It stands a little to the west. The precinct wall can also be traced, as may the site of the gatehouse. Close to this are the ruins of the *capella extra portas*.

Much could be said about the other remains of the monastery, but until the ruins are freed from the deplorable growth of trees, bushes, and ivy and accumulated rubbish, many interesting problems must be left unsolved.

W. H. ST. JOHN HOPE.

#### PAIR OF SEMI-DETACHED HOUSES IN THE MELBURY ROAD, HOLLAND PARK.

An endeavour has been made, in building these houses, to recognise and accept the present conditions of house-building in London—more especially as regards the dirt and the impurities of the atmosphere. They are faced externally throughout with salt-glazed bricks, which, being of fire-clay vitrified at a high temperature, may be looked upon as proof against the disintegrating forces of the London air. These bricks, being virtually unchangeable, I have had to renounce the aid that time gives to a building by blunting its edges, softening and blending its colours: but as a *per contra* one has the satisfaction of knowing that the house is built of durable materials, wind-proof and rain-proof, and whatever effect one can manage to secure, that effect is indestructible. In the case of the usual brick house—whilst the brick and stone are ageing and weathering, the woodwork is periodically being renewed (in effect) by repainting—and the acquired harmony of the whole is constantly being dislocated by this renewal: but with these houses, every time the external woodwork is recoloured the bricks can be washed down and the original effect—for what it is worth—maintained. Internally great use has been made of glazed surfaces. The halls, passages, staircases, bath-rooms, &c., have their walls covered with tiles and their floors laid with marble. No baths, pipes, or sanitary fittings have casings.

The work is being carried out by Messrs. Walter Holt & Sons, builders, of Croydon.  
HALSEY RICARDO.

#### COMPETITIONS.

**MILNER INFIRMUM HOSPITAL COMPETITION, BELFAST.**—In this competition thirteen designs for a building to cost 20,000l. were sent in on May 31 to the assessor, Mr. Thomas Drew, F.R.I.B.A., President of the Irish Institute of Architects, under conditions which secured perfect anonymity, and he has placed four designs in order of merit, thus:—1st. W. J. Fennell, Belfast; 2nd. W. J. W. Ferguson, Belfast; 3rd. G. W. Ferguson, Belfast, and A. J. Gordon, London; 4th. A. J. Jackson, Belfast. The assessor recommends that the second, third, and fourth competitors should be frankly informed that the competition is practically decided by the excellence of planning of No. 1, and that a second competition could not vary the respective merits of the general designs.

**EXTENSION TO MARKET, &c., LANCASTER.**—In a public competition for extension to the markets and a new Market Hotel, the Corporation of Lancaster have awarded the first premium of 75l. to Mr. Barton, of Manchester, and the second premium of 25l. to Mr. R. Walker, F.R.I.B.A.

**SEWAGE DISPOSAL, MONMOUTH.**—At the monthly meeting of the Monmouth Town Council, held on Monday, the report of Messrs. Bramwell & Harris, of Westminster, on the competitive schemes for the disposal of the sewage of the borough of Monmouth, was read, and the premium of thirty guineas for the best scheme awarded to Mr. W. H. Radford, Nottingham, and the premium of twenty guineas for the second best to Messrs. John Parkin & Son, of Westminster.

**HIDDEN-PIPE INFECTIOUS HOSPITAL.**—We understand that the designs for this were delivered on the 29th ult., between forty and fifty sets having been sent in. The "Instructions" promised that there should be an assessor appointed by the Institute of Architects, and a Medical Officer of Health of an important borough to assist in the selection.

#### Correspondence.

To the Editor of THE BUILDER.

#### SEWER AND DRAIN VENTILATION.

SIR,—In his letter on pp. 501-2, Mr. Read states that the advocates of "interceptors" admit that they interfered with the ventilation of the sewers. Now, we make no such admission so far as the right or proper ventilation of the sewers is concerned. Sewers are put in at the expense and for the benefit of the community, and the community have a right to have them constructed in the most beneficial manner, and their ventilation is merely an item in the general expense. The engineer who cannot so construct and ventilate the public sewers as to make them independent of the private soil-pipes in our houses is a bungler, and his attempt to hide his own incompetency at the expense of the occupiers of houses only makes matters worse.

Mr. Read writes not only against the general opinion of the members of his own profession, but he has the medical profession dead against him, while also in this relation the opinion of educated and experienced plumbers should count for something.

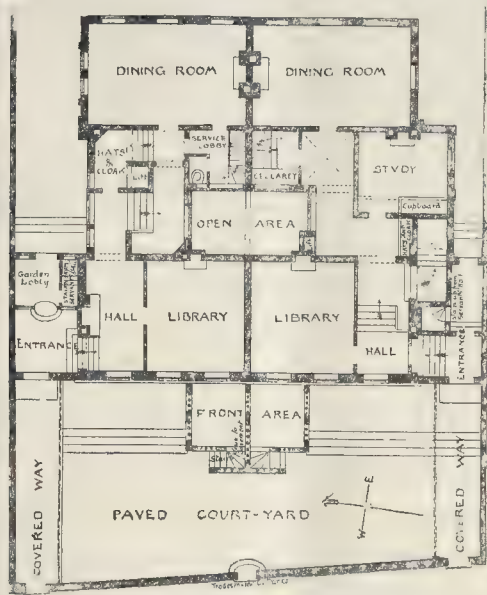
The fourth paragraph in Mr. Read's letter, in which he tells us about the rise and fall of the sewage flow, and that it is least between midnight and 6 a.m., tells dead against himself; for it shows the necessity for the interceptor to lock off the extra amount of sewer-gas generated—when people are lying in their beds with windows shut—from the exposed portions of the sewer below the maximum flow. I happened to meet Dr. Carmichael a few days ago, when this subject was referred to. He, as a medical man who had given particular attention to the subject, protested strongly against the removal of the intercepting trap between the house and the public sewer.

On page 502 Mr. Read refers to the water-flow as being the chief agent in sewer ventilation. In this opinion he is dead against Mr. W. Santo Crimp, M.Inst.C.E., who, after elaborate experiments, asserts that the wind is the chief agent.

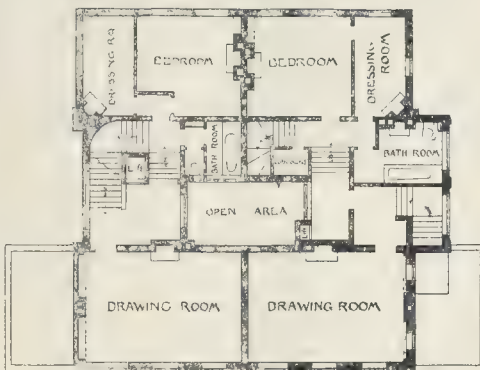
Mr. Read is also drawing upon his imagination when he writes about the sewer gas bubbling up through water-traps with 2 in. of water-lock, to the detriment of the drains behind them. In cases of this sort there is something wrong, or that the mouth or outlet of the drain was below water-level, in which case the drain as a ventilator for the sewer would be useless.

Mr. Read speaks of "a good 'wash-down' pan





GROUND FLOOR PLAN.



FIRST FLOOR PLAN.

Pair of semidetached Houses in the  
Manning Road, Holland Park.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

and trap-closet." As a plumber I admit a good wash-down closet is good, but I think a "pan" closet bad. Mr. Read seems to have got a little mixed here.

As to the one or two individuals who assert the absence of the interceptor is a benefit to the occupants of the house, I do not believe them. I have personally examined places where similar notions had been carried out, to the benefit of those interested, but when I saw them I had to style the report a false one, and after the *exposed* the things had to be altered. Persistence in a bad plan is no proof of its goodness.

Mr. Read has entirely ignored the benefit of the interceptor in locking off rats, as also the protection the interceptor has been in many cases while railway tunnels have been cut through below our streets and the blasting disturbed the drain of the houses. Altogether, Mr. Read's advocacy of the abolition of the interceptor is a very poor one, and is entirely based upon very shallow and often fanciful premises.

W. P. BUCHAN.  
Glasgow, June 30th, 1894.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—I.

#### PRELIMINARY.

THE benefit of a plentiful supply of wholesome water in the country is hardly to be over-estimated. Until recent years general systems of supply were almost entirely confined to towns; and, except in a few cases, where liberal-minded landowners carried out gravitation, or even small pumping schemes for the supply of water to their estates, rural populations were largely dependent upon open streams and shallow wells, which are always liable to pollution. The necessity for a proper supply of water to towns and congested populations generally is evident to all; but the idea that there should be any difficulty in procuring potable water in the country would seem incredible to most people who had not made rural life more or less of a study. The matter, however, rises to great importance when we remember that country areas are the source of supply of most of the food which is consumed in towns; and that when, for instance, a farm supplies milk for sale, any evil conditions under which that milk is produced follow it; and an impure water supply at a farm is frequently the cause of an outbreak of typhoid fever amongst the consumers of the milk at a distance.

A great change has, however, recently taken place, and schemes of rural water supply, especially in the Midlands, have become as plentiful as blackberries. This is partly attributable to the advance in sanitary knowledge, and to the necessities of rural populations becoming daily more pressing. Sources liable to pollution tend to become more polluted, and pollution, generally speaking, is cumulative. The recent exceptionally dry seasons have brought to light distressing cases of privation, and one exposure has led to others.

The Local Government Act, 1888, has enabled County Councils to put considerable pressure upon local authorities, when they are of opinion, on the report of their Medical Officer of Health, that such authorities are not properly performing their duties under the Public Health Acts, one of which is to provide efficient water supplies for their districts.

The Local Government Act, 1894 (commonly known as the Parish Councils Act) includes two sections, which will probably facilitate the provision of many rural water supplies, which have hitherto appeared impracticable.

Sec. 8 gives power to a parish council "to utilise any well, spring, or stream within their

parish, and providing facilities for obtaining water therefrom, but so as not to interfere with the rights of any corporation or person."

Sec. 16 provides that where a parish council resolve that a rural district council ought to have provided the parish with a supply of water "in cases where danger arises to the health of the inhabitants from the insufficiency or unwholesomeness of the existing supply of water" (Public Health Act, 1875, sec. 299), complaint may be made to the County Council, which may transfer those duties to itself, or may appoint a person to perform the duty.

There are very important differences between urban and rural water supply, which make the difficulties to be contended with much greater in the latter than in the former. Except where the scheme is carried out by private individuals, for the benefit of their estates, the duty of providing an efficient water supply usually devolves upon the Local Authority.

By the Public Health Act, 1875, sec. 299, it becomes the duty of a local authority to provide their district with a supply of water, "in cases where danger arises to the health of the inhabitants from the insufficiency or unwholesomeness of the existing supply of water, and a proper supply can be got at a reasonable cost." The money for carrying out such a supply is usually obtained on loan (after a Local Government Board inquiry), repayable by yearly or half-yearly instalments of principal and interest in thirty years. The present rate of interest is usually  $\frac{3}{4}$  per cent. per annum, which makes the annual instalment 67. 8s. 9d. per cent.

This annual charge, together with the working expenses, has to be met either by a water-rate over the whole area, or by charges made upon the consumers, or by both. In an urban district, where nearly the whole of the population benefit by the supply, a water-rate is not necessarily a hardship; but in rural districts, where the area is determined by parish boundaries, and only a small portion of the population benefit by the supply, the case is different. As a consequence of the shuffling which frequently becomes possible through the intricacies of the law upon the subject, the few are sometimes benefited at the expense of the many. A small village had a fairly good water supply, but it included a patch of elevated ground excellently suited for building sites, but where water was conspicuous by its absence. Largely through the instrumentality of a local architect, himself a leading member of the local sanitary authority, this patch of ground was covered with houses of the villa class, in spite of Section 6 of the Public Health (Water) Amendment Act, 1878, which makes it unlawful in any rural district for the owner of any dwelling-house which may be erected or rebuilt

Sir,—In the letter by Mr. R. Read, City Surveyor, Gloucester, in your last week's issue, he mentions my late father's name as an instance of an experienced engineer having advocated the principle of connecting all water-closets direct with the sewers, this having been done in Frankfort-on-the-Main. Although this was to a great extent done by my late father when carrying out the drainage of Frankfort, yet Mr. Read should bear in mind that nearly the whole of the sewers in that town were entirely reconstructed, and only on the connexion of the house drains with these new sewers was this system of doing away with interceptors adopted; as special facilities and provisions for flushing and cleansing were then in force, such as probably existed nowhere else. For further particulars I refer Mr. Read to the paper read at the Sanitary Congress in 1885 at Leicester by my late father on "Continental Drainage." In no instance could my late father be called an advocate of Mr. Read's system, where the connexion was made with old sewers, and where the flushing arrangements were not perfect; and unless he knew the main sewers to be well constructed and ventilated by open gratings, he would always insist on an interceptor being placed between soil pipe and sewer, combined with a fresh air inlet.

T. S. GORDON.  
July 3, 1894.

THE ROYAL INSTITUTION.—The managers of the Royal Institution have accepted from Mr. Ludwig Mond, F.R.S., the gift of the freehold of No. 20, Albemarle-street, with the object of enabling the Royal Institution to carry out a long-cherished scheme of a chemical research laboratory in connexion with the Institution. The freehold of the property is offered by Mr. Mond on the express understanding that it is to be used for this purpose, and that the laboratory is to be called "The Davy-Paraday Research Laboratory of the Royal Institution."



after the passing of this Act, to occupy or permit the same to be occupied without first obtaining the certificate of the sanitary authority, "that there is provided, within a reasonable distance of the house, such an available supply of wholesome water as may appear to such authority to be sufficient for the consumption and use for domestic purposes of the inmates of the house." The houses being built and occupied, it became necessary to provide them with water; so a scheme was approved and carried out by the local sanitary authority. To meet the expenditure attendant upon the first cost of the scheme, for obvious reasons, a water-rate was made over the whole parish, instead of a charge being made on the consumers only. One of the inhabitants of the village, who resided upon his own property, had, previous to the above events, expended over a hundred pounds in order to efficiently supply his house with water from an excellent, never-failing well upon his premises. Notwithstanding that this supply had been pronounced of exceptional purity by competent analysts, this unfortunate owner was compelled to contribute some 3/ a year for a commodity which he in no way required. It is needless to observe that this individual was not the only sufferer.

In certain cases the Local Government Board will consent to a special district being constituted, excluding as far as possible such areas as will not receive or do not require a supply. The Local Government Board, however, are rarely in favour of this step for purposes of water supply alone.

The only alternative, therefore, is to make a charge upon the consumers sufficient to cover the periodical instalments of principal and interest, as well as the working expenses of the scheme.

The maximum charge which may lawfully be made (except under special circumstances) where a house is without a proper supply of water, and where a supply is enforced by a local authority, is 2d. a week per house, or 8s. 8d. a year. Where, however, the supply is given by agreement, the authority may make such reasonable charge as they think fit. Where the rate is levied upon the consumers only it must be so adjusted as not to produce a profit which would benefit the ratepayers at large at the expense of the consumers.

A usual charge is 2d. per week for houses with a rateable value under ten pounds per annum, and 5 per cent. per annum when the rateable value exceeds that amount. This scale averages 5 per cent. per annum throughout.

If the annual instalment of principal and interest, together with the working expenses, does not exceed 5 per cent. on the rateable value of the property supplied, the scheme can be made self-supporting, as the remainder of the parish or parishes, receiving no benefit from the supply, need not be made to contribute. If, however, the expenditure exceeds the receipts, the balance must be met by a special water-rate levied over the whole area, irrespective of benefit.

As the rateable value of rural is considerably less than that of urban districts, area for area, and as the length of pipe necessary for the supply of a given number of houses is many times greater, the first cost of a water-supply scheme for a rural area must of necessity be made relatively small and the working expenses reduced to a minimum. To secure this end gravitation schemes are usually the only means which can be entertained, as the 5 per cent. above-mentioned rarely allows a sufficient margin for the working expenses of a pumping establishment. Occasionally a self-acting pumping system becomes possible where a fall of water can be utilised to work a water-wheel, turbine, or hydraulic ram.

In the following papers it is proposed to deal with such schemes as are usually feasible in rural districts, taking the above remarks into consideration. The various systems for affording such supplies will be described in detail, the principles explained, the machinery and materials carefully described, and the necessary information supplied both for preparing and carrying out the schemes. Plans, sections, specifications, and estimates of cost will be given, and, where possible, detailed prices of materials and workmanship will be indicated.

**ARCHITECTURAL ASSOCIATION.**—The visit to Knoke House, announced in our advertisement columns for last Saturday, is in repetition of that which was fully described in the columns of the *Builder*, see p. 227, vol. 59.

**APPOINTMENT OF COUNTRY ARCHITECT.**—Mr. M. H. Medland has been appointed Architect to the Gloucestershire County Council, in succession to his father, the late Mr. James Medland.

### GENERAL BUILDING NEWS.

**RESTORATION OF ST. MICHAEL'S CHURCH, LINLITHGOW.**—St. Michael's Church, Linlithgow, is, says the *Scotman*, being restored, but on right lines. The modern partition between nave and chancel has been removed, and the galleries, erected about 1822, when the chancel was fitted up as the parish church, have been cleared away, and with the best results. The inside floor, which had been raised a foot above its original level, burying thereby the bases of the piers, and obliterating the step between it and the chancel, has been lowered, and among other necessary work which will be undertaken will be the rebuilding of the chancel arch, the formation of a heating chamber on the site of the old vestry, the renewing and altering of the heating apparatus, and the reseating of the church. A few weeks ago several gentlemen interested in the preservation of our old ecclesiastical and other buildings visited St. Michael's along with Mr. Honeyman, Glasgow, the architectural adviser of the committee, and suggested that the scheme now in progress should be completed (1) by cutting out a plaster ceiling of late introduction which took the place of the original open oak roof, and which, crushing down upon the clearstory windows, dwarfs the height of the interior; (2) that an oak roof should be substituted for the pitch-pine at present hidden by the plaster roof; (3) to put in choir-stalls and screens; (4) to restore the broken mullions of the triforium; (5) to restore the crown on the tower; and (6) to erect a vestry in harmony with the present building. Mr. Honeyman advised that for another 7,000l. these desirable works could be accomplished.

**BOARD SCHOOL, HARRGATE.**—A new Board school is shortly to be erected in Coldbath-road, Harrogate, from the designs of Mr. T. Edward Marshall, architect, of Harrogate. The style chosen is Renaissance freely treated. The school is designed for 305 infants and 620 mixed scholars, and the school is on the central-hall plan. Entering from Coldbath-road separate doors give access to the infants' school, cloak-room and lavatories being provided in a projection. Leaving the cloak-room, the infants file right and left into the ground-floor central hall, one-half of which is devoted to their use. Their five class-rooms are divided from the central hall by glass screens. The mixed school will use the other half of the hall, and for them two class-rooms are provided. Ascending to the first-floor by staircases, on the north and south sides of the building on the mezzanine floors are provided rooms for the teachers, with lavatories. The central hall is 73 ft. long by 32 ft. wide, from which open out, divided as on the ground-floor by glass screens, three class-rooms on either side, two to seat sixty and one seventy scholars. In the main building space is found for the boilers, a store-room, and coal-cellars in the sunk basement on the north side where the ground falls away. Abutting on the west side of the playground boundary-wall a two-story building will be erected for a cookery instruction centre, on the ground-floor, the first-floor, reached by a flight of outside steps, being devoted to manual instruction. Separate playgrounds with covered playsheds are provided at the rear of the building.

**CONGREGATIONAL CHURCH, WEST HAMSTEAD.**—A Congregational church is being built at the corner of Finchley and Burrard-roads, adjoining Hackney College. The plan of the church is that of the Central Area type of church building, and accommodation is provided for 500 persons. Five doorways have been provided on the ground floor, and lobbies are placed at the entrances. The floor of the church will be formed of solid wood blocks laid on cement concrete. The style of architecture adopted is Gothic. The whole of the external walls will be faced with red bricks, and the ornamental dressings will be of terra-cotta and of moulded bricks. The roof of the church will be supported by hammer-beam principals, which will be exposed to view, the spaces between being plastered. The internal faces of all walls will be plastered. The windows will be filled in with stained glass. The roof will be boarded, felted, and covered with green slates. The pews, gallery roof, roof principals, and all internal woodwork will be made of pitch-pine. The school department contains a hall, with a nave and two aisles, and the aisles are so arranged that six class-rooms can be formed on each side of the hall. The school hall will afford accommodation for about 500 persons, whilst the infants' class-rooms will seat about 100 children. A library, a large class-room, and kitchen will complete the school department. Accommodation is also provided for a caretaker, and a living room, scullery, and two bedrooms are included in this scheme. At the present time the church alone is being built, and the contract for this and the two vestries, the boundary walls, &c., is being carried out by Mr. T. H. Kingerlee, of Oxford, at a cost of 7,919l. 10s. Messrs. Spalding & Cross are the architects for the buildings, under whose supervision the work is being carried out. Mr. W. H. Gathcote is the clerk of the works.

**MASONIC BUILDINGS, LINCOLN.**—The foundation stone of the new rooms intended to be erected in Mint-street, Lincoln, for the accommodation of the Freemasons at Lincoln, has just been laid. The new building will be in the Georgian style, and will have a frontage to Mint-street of over 50 ft. It will

be built of specially-made red brick with Ancaster stone dressings. The ground floor will contain two shops, an entrance for the Masonic brethren, and a banqueting-hall. In the upstairs portion there will be a room and ante-room, and offices for the Provincial Lodge. On the ground floor, also, there is a kitchen for the banqueting-room, and the usual offices. The contractors are Messrs. H. S. & W. Close, and the architects Messrs. W. Mortimer & Son.

**SUNDAY SCHOOLS, BOW.**—On the 25th ult. St. Stephen's Sunday schools, Saxon-road, Bow, were opened. The new building, which has replaced an iron structure that for nearly forty years was used as a schoolroom and a mission-hall, cost 2,000l. Mr. Holmes was the architect, Messrs. Perry & Co. being the contractors.

**CHURCH INSTITUTE, YEADON, YORKSHIRE.**—The memorial-stone of a new Church Institute and Sunday-school for Yeadon was laid on the 30th ult. The new building, from the designs of Messrs. T. H. & F. Healey, architects, of Bradford, will comprise a gymnasium, young men's room, four class-rooms, and a large assembly hall, capable of accommodating nearly 400 persons.

**ENLARGEMENT OF COXLEDGE ASYLUM, NEWCASTLE.**—A commencement has been made with the enlargement of the Newcastle City Lunatic Asylum at Coxledge. When the extension has been completed, the accommodation at the asylum will be doubled. The work at present in progress in connexion with the enlargement consists in the formation of the foundations, the construction of which has been entrusted to Mr. Ferguson, contractor, of Newcastle. The cost of the foundations alone is estimated at from 9,000l. to 10,000l.; while the total cost of the new building will not be far short of from 80,000l. to 100,000l. The architect is Mr. Dyson, of Newcastle.

**RESTORATION OF CHURCH, MISSON, LINCOLN.**—The parish church of Misson, dedicated to St. John the Baptist, was on the 26th ult. reopened by the Bishop (Dr. Ridding), after restoration. The church was partially destroyed by fire in 1693. The portions of the church which were dismantled have been rebuilt at a cost of about 1,350l. For the restored portions of the structure the architect was Mr. J. Hodgson Fowler, of Durham, and the builders were Messrs. Bowman & Sons, of Stamford. New roofs have been added to the nave and north aisle, and that of the south aisle made good, two new floors placed in the tower, the walls repointed, the chancel floor raised, the old seats renewed and new ones supplied where required. The four old bells which were hurled to the ground and shattered to fragments have been replaced by six new ones, cast by Messrs. Warner & Co., of London.

**WESLEYAN CHAPEL, WHITCHURCH, NEAR CARDIFF.**—The foundation-stone of a new Wesleyan chapel for Whitchurch was laid on the 27th ult. The new chapel is to be of the Gothic style, the plans of which have been designed by Mr. Charles C. Jones, architect, Cardiff. Its length is to be 80 ft., and its width 29 ft. 6 in. The roof and walls are to be 6 in. wide. The plans were prepared by Mr. E. M. Bruce-Vaughan, and the contract has been carried out by Messrs. Edmund Rees & Sons, Pencoted. The cost will be about 2,400l.

**CHURCH RESTORATION AT BRIDGEND.**—The restoration of the chancel of Newcastle Parish Church, Bridgend, has just been completed. The new chancel is 28 ft. 6 in. long, 8 ft. 9 in. high to the wall plate, 29 ft. 6 in. high to the roof, and 6 in. wide. The plans were prepared by Mr. E. M. Bruce-Vaughan, and the contract has been carried out by Messrs. Edmund Rees & Sons, Pencoted. The cost will be about 2,400l.

**CASUAL WARMS AND PORTERS' LODGE, BEVERLEY WORKHOUSE.**—The principal entrance of this building is to face Union-road, and is designed to correspond with the New Infirmary (just completed). The building comprises the porter's lodge, archway over the main road to the workhouse, and the male side of the casual wards. The casual wards are to consist of associated ward for twenty male vagrants, nine sleeping-cells, eight of which are to have work cells attached; also six stone-breaking bunks in yard; and an associated ward for eight female vagrants and sleeping-cells for four others. There are also to be receiving-rooms, bath-rooms, lavatories, water-closets, drying-rooms for clothes, and coal-bosses for both male and female sides. The cells, &c., are to be heated on the high-pressure system, the apparatus being sufficiently powerful to maintain a uniform heat in the various rooms and cells of 60 deg. when the thermometer is at 32 deg. in the open; and 90 deg. in the two drying-rooms. There is also a disinfecting-room. Messrs. Hawe & Foley, of Beverley, are the architects.

**NEW CHURCH, NORFOLK-SQUARE.**—Mr. Ralph Nevill, F.S.A., has been appointed architect for the new church of All Saints', Norfolk-square, which is to replace that recently destroyed by fire.

**BRITISH HOME FOR INCURABLES.**—The new building of the British Home for Incurables was opened by the Princess of Wales on the 3rd inst. The site of the building is in Crown-lane at the upper end of Streatham Common, the frontage being about 300 ft. The building has been erected from the designs of the late Mr. Arthur Cawston. The inmates are grouped into separate families, each with its own living-rooms, sleeping-rooms, service, and sanitary wing. The length of the building is



*W. R. Smith & Son*: No. 47, Lambeth Palace-rd., u.t. 30 yrs., g.r. 11*l.* 55., 425*l.*; 13, 14, Osborne-ter., Clapham, u.t. 33 yrs., g.r. 15*l.*, r. 96*l.*, 655*l.*—By *A. Barton*: 18,



## CONTRACTS—Continued

Those marked with an asterisk (\*) are advertised in this Number. *Contracts*, pp. iv., vi., vii., viii., and ix. *Public Appointments*, pp. xxi. and xviii.

Patman & Potheringham.....	£1,951	Lowe .....	£1,710
Parker .....	1,825	Grubb & Sons.....	1,670
Payne .....	1,798		



John Campbell.....	£15	10	0	Charles Roberts, Tow	
Adam Robertson.....	15	0	0	Law <sup>r</sup> .....	£12 0

\* Accepted,



**NEWBURY.**—For additions to St. Mary's Schools, Newbury. Mr. James H. Money, architect. **£241 0 0** Samuel Elliott, Newbury (accepted) 498 14 10  
A. C. James 499 0 0

**NEWCASTLE-UNDER-LYME.**—For seat-paving Penkhill-street, Ladlane &c. for the Town Council. Mr. James Pattison, Borough Surveyor, Newcastle-under-Lyme.

F. Barker 652 7 0  
Smith & Taylor, Basford, near New-  
castle 654 0 0  
John Horobin, Colridge, Stoke-on-  
Trent 655 0 0  
Borough Surveyor 656 0 0 44  
\*Accepted.

**NEWPORT (Mon.)**—For the construction of storage and intake reservoirs, tunnels, road-division, &c. for the Town Council. Mr. Conyers Kirby, C.E., Stone Chambers, Newport. **£112 10 0**  
Bell 113 10 0  
Allen 114 10 0  
T. T. Pugh 115 10 0  
Rend & Hinchon 116 10 0  
John Ald & Son 117 10 0  
Rutter 118 10 0  
Lawson 119 10 0  
[Engineers' estimate, £64,170 vs. 40.]

**NORTHAMPTON.**—For additions, &c., to vagrant wards, for the Union Guardians. Mr. J. A. Picaver, architect, 7, Wood Hill, Northampton. (Quantities by architect.) **£507 10 0**  
A. I. Chown 508 10 0  
G. W. Souther 509 10 0  
G. W. Souther 510 10 0  
G. F. Sharnam 511 10 0  
J. Dunckley 512 10 0  
J. M. Panting 513 10 0  
[All of Northampton.]

**NORTHAMPTON.**—For forming &c., roadway (Greenwood-road), for the Rt. Hon. Earl Spencer, Messrs. Jno. Ingham & Watkin Bros., 7, George row, Northampton. (Quantities by architect.) **£28 0 0**  
Brown 29 0 0  
Hall 30 0 0  
Martin 31 0 0  
Farmer 32 0 0  
[ton accepted] 635 0 0

**NORWICH.**—For granite paving certain streets in the city, for the Corporation. Mr. O. E. Winter, C.E., City Engineer pro tem., Guildhall, Norwich.

Labour only.  
W. Griffiths 2 0 per sq. yd.  
C. Hall 2 0 14  
W. Wadley 2 0 14  
H. Burham, Darlington Street, Norwich 2 0 14  
J. Speight 2 0 14  
[too Standards of Pool for West Paving.]  
Jewson & Sons, Norwich (accepted) 2 0 6 per standard marked W.R.W.

**ORPINGTON (Kent).**—For the erection of a pair of semi-detached cottages, for Mr. Joseph S. Doyle, Mr. Thomas Marsh, architect, Bromley, Kent. **£525 0 0**  
Thompson 526 0 0  
Sumner & Son 527 0 0  
C. Satchell 528 0 0  
[Architect's estimate, £533.]

**PARKSTONE.**—For the rebuilding of the "Half Way" Hotel at Parkstone, for Messrs. Hall & Woodhouse. Mr. H. F. J. Barnes, architect, Poole. **£1,600 0 0**  
W. J. Chisholm, East Cliff Works, Bournemouth 1,600 0 0

**PENBROKE DOCK.**—For additions, &c., to school buildings, 1, Llanon, Penbroke Dock, for the School Board of the Borough of Penbroke. Mr. John E. P. Laid, architect, Maun-street, Penbroke. **£230 15 0**  
Evans & Morris 231 15 0  
Davis & Morgan 232 15 0  
Frederick Nokes 233 15 0  
\*Accepted subject to approval of Education Department.

**PLYMOUTH.**—For the restoration of St. Margaret-in-Meneage Church, near Helston. Mr. Edmund Sedding, architect, 7, Buckland-terrace, Plymouth. **£1,070 0 0**  
Ellan 1071 0 0  
Evan & Richards (accepted) 940

**PONTYPOOL.**—For the erection of twenty cottages in blocks of ten houses each. D. Lewis, Llanthelw, **£3,485 0 0**

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Chas. Lomas, Higher Summers, near Schedule of Bury 1,000 0 0  
\*Accepted.

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R. D. Pearson 542 10 0  
Chaplin & Son 543 10 0  
\*Accepted.

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John Williams 53 15 0  
John Thos. Jones, Celm-Maw, Rubanon (accepted) 53 0 0

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Hobbs 662 0 0  
Hollowell 663 0 0  
\*Accepted.

**RUGBY.**—For additions, &c., to public offices, Widdow-street, for the Local Board. Mr. J. H. Brierley, Surveyor, Rugby. **£124 15 0**  
J. Young 125 15 0  
J. Hollowell 126 15 0  
A. Harris 127 15 0  
\*Accepted.

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Siddons & Freeman 1001 0 0  
S. & W. Panton 1002 0 0  
J. Crawshaw 1003 0 0  
H. Hibbins 1004 0 0  
\*Accepted.

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P. Powell 5002 0 0  
Jas. Byron 5003 0 0  
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W. Howland, High-  
street, Thame 176 10 0  
Surveyor's estimate 177 10 0  
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# The Builder.

VOL. LXVII. No. 2681.

JULY 14, 1894.

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### Armorial Bearings of Counties and Cities.



It is mainly from the artistic or architectural point of view that the subject of public armorial bearings is of interest to us. There are those no doubt—and probably some among our own

readers—to whom heraldry is a kind of sacred study, to be pursued in the most serious spirit, and with a lofty scorn for all those who are either indifferent or heretical in their heraldic creed. This spirit of intolerance and contempt for the outer barbarian which is characteristic of devout heraldic students, naturally arises from the fact that the study is one which comparatively few persons go into, and which can only be understood in detail by the devotion of the best part of one's time to it. Hence those who have chosen thus to devote themselves form a small band of experts, learned in a subject which they have pretty much to themselves, and with a corresponding degree of contempt for the rest of mankind, who are unacquainted with what are called the "laws of heraldry," which are spoken of very much as if they were the laws of nature, instead of being in fact merely the conventions under which a semi-barbarous society arranged a system of pictorial signs at a time when scarcely any one could read writing, and when, the chief business of life being fighting, it was desirable to have some sign to fight under, recognisable by friends and foes. That is all that heraldry originally meant. The glamour thrown over it by modern writers is merely a matter of poetic association with a practice which carries us back into past and perhaps more picturesque times. And certainly the system of a distinctive device for states, cities, or individuals, is in itself an element of the picturesque in life which one would be sorry to lose. That is the one justification for the assumption of armorial bearings in the present day. It is a little bit of the decoration of life; if a useless, it is at least a very harmless one; and—

the interest attaching to the keeping up of an ancient practice. In the case of armorial bearings which have been borne by the same city or the same person for many generations past there is of course, added to this picturesque element, a real historic interest.

In the picturesque sense perhaps the armorial bearings of cities are of more interest and value than those of individuals, since they enter into and often form an important element in the decoration of public buildings. Hence there is much that is both useful and interesting for architects in the large collection of the armorial bearings of counties and cities which Mr. Fox-Davies and Mr. Crookes have brought together for us.\* These represent the arms "as used and as authorised," a distinction which Mr. Fox-Davies draws very decisively indeed, both in his preface and in the cyclopædia of contents. Nothing can exceed his lofty contempt for the corporations (not a few) which display arms to which they can show no legal title, and the history of which will not bear investigation. "There is no law, and I think more is the pity, which requires any corporation to obtain a grant of arms; there is no law, and I will go further, and say there is no custom, which requires a corporation to use arms; consequently there is no excuse for a coat-of-arms being invented by a seal engraver; there is no excuse for the smallest display of a *bogus* escutcheon, and as emphatically as I am able I must protest against the unauthorised manufacture of bogus arms. . . . As for the design upon your seal, you can make it after any fashion you please; you may draw and engrave anything you can imagine upon it without breaking any law written or unwritten, so long as you refrain from placing your design or any part of it on an escutcheon or displaying it as armorial insignia. With every other conceivable form of ornament and decoration to choose from, that escutcheon seems to be a standing temptation to which few do not succumb. Was a better argument ever wanted or suggested as to the decorative character of armorial bearings?"

That is just the point; the value of armorial bearings in the present day, especially for cities, is mainly decorative or picturesque, and corporations do not like to see another city with this ornament when they are without it. What Mr. Fox-Davies means by a bogus coat-of-arms is, we presume one which has not been obtained by royal grant through the Heralds' College. According to his own statement, however, there is nothing illegal in a city choosing and using any device it pleases, so that the crime of "bogus arms" is not quite so flagrant as one as might be supposed from his indignant manner of denouncing it. However, we quite concur with him that as long as armorial bearings are used as decorations, it is suitable that they should all be on the same footing, and that especially a modern town which has any chance of having a history before it will be in a more dignified position if it has its armorial bearings formally registered in the proper quarter, and after payment of the proper fees. Only in this way can it be said to bear arms on the same footing with an ancient city which has obtained them by royal grant. In cases, however, where there has been originally no formal and legal grant of arms, there is a considerable distinction to be drawn between armorial bearings which, however selected or obtained at first, have been used for a long period—say a couple of centuries or so—and a brand-new and unauthorised selection. The former has, at all events, historical interest. In the case of private armorial bearings, the Heralds' College recognises the claims of custom to some extent; so far, at least, that there is always a disposition to confirm with a legal grant, if applied for, armorial bearings which are shown to have been used by the family for some generations, even if of no original authority.

There is reason in the author's criticism as to the manner in which modern city arms are sometimes compounded. A very common practice, he says, is to take the whole or a portion of the achievement of some local "bigwig." Mr. Fox-Davies has nothing to say against "allusion" being made to local bearings; on the contrary he thinks it a commendable practice, but there must be no chance of the arms of the town being confused with the arms of the person. He mentions the instance of Wolverhampton, which "supports its own so-called coat

\* "The Book of Public Arms; a Cyclopædia of the Armorial Bearings, Heraldic Devices, and Seals, as authorised and as used, of the Counties, Cities, and Universities of the United Kingdom." Derived from the Official Records. Compiled and edited by Arthur Charles Fox-Davies and M. E. B. Crookes. Edinburgh: T. C. & E. C. Jack; 1894.

with an escutcheon of the Leveson-Gower arms surmounted by a ducal coronet, 'by his Grace's permission.' "Is it not known," says our author indignantly, "that no person can give, sell, or bequeath his coat-of-arms to another person? It is not his absolute property?" The patent is for himself and his descendants; to go outside them requires a fresh grant. This is common sense no doubt, if confusion is to be avoided as to any meaning which armorial bearings are still to have. Mr. Fox-Davies is also contemptuous, and we sympathise a good deal with him, as to the habit of tradesmen to use the arms of their city as a mark on their goods. The armorial bearings, as he truly says, were not granted to be put on Smith's perambulators or on Brown's sugar-bags, but "to be borne and used for ever hereafter by the mayor, aldermen, and burgesses of the said town of — and their successors in office in their corporate capacity, on shields, banners, seals, or otherwise according to the laws of arms," &c. To allow people to make a trade-mark of them is certainly to make them very cheap. But where we are entirely and emphatically in sympathy with the author is in his criticisms on some of the absurd devices, equally un-heraldic and un-decorative, which are adopted by modern towns whose Corporations think they must needs have armorial bearings. One of the most ludicrous of these is that of Southend-on-Sea, which the author says might best be described as "Illustrated Bits." The escutcheon is divided into three panels (we spare the reader the orthodox phraseology), one containing a view of a pier with the sea and ships, another a field and a well, another a view of a church; over all an inescutcheon, superimposed on the centre of the main one, bearing three scimitars, "the arms usually attributed to the county of Middlesex." Over all is a crest of a ship in full sail. Now, from a decorative point of view, the devices on an escutcheon should of course not be realistic, but conventionalised and suggestive only; this sketching of natural scenery on it is perfectly puerile. The armorial escutcheon of Crewe is equally ridiculous, in the same kind of manner.

It is noteworthy, generally, that modern armorial bearings are chosen much more with the view of conveying some special symbolical meaning appropriate to the city to which they refer than was usually the case with ancient ones. To this we see no objection whatever, provided that they are treated in a decorative and symbolical form, not realistically. In a great many of the old armorial bearings given here it is difficult to see any symbolical meaning in reference to the city they belong to, or the slightest connexion between the design and the motto (where there is one). There may, however, in many cases have been a significance at the time in the emblems chosen which escapes us now. What, for instance, is the hidden meaning of the arms of Dublin—three castles with flames issuing from their turrets, and the motto, "Obedientia Civium Urbis Felicitas"? Artistically, however, this is a striking escutcheon. County Down, on the same page, is another example of the modern realistic treatment; a ship below; on a band in the centre a sheaf with a weaver's shuttle on each side; and above two perspective representations of spinning-wheels; motto, "Industria." This remarkable conglomeration has been recently invented, it appears, to express the revived industrial efforts or ambition of the county. That is certainly an example of the way *not* to do it. A good contrast in the way of a modern escutcheon is that of Harrogate, only granted in 1884, but with the dignity and conventional character of the ancient style about it, and a good deal of ingenious symbolism, with the rather dry and prosaic motto "Arx Celebris Fontibus." The arms of Yarmouth are significant; three lions and three fishes occupy re-

spectively the two sides of the shield, but partially overlapping and cut off at the centre dividing line; motto, "Rex et Nostra Jura," a plain intimation that loyalty was not to stand in the way of local privileges. This curious escutcheon is an old one, apparently, but the date is not given. That of Hastings, also old, divides lions and ships on the same principle, and Sandwich, Rye, and Deal have somewhat similar devices.

It cannot be said however that the majority of our ancient arms show any very high type of decorative design. What can be said for them is that they seldom attempt realism, and that consequently they have an architectural character which eminently fits them for use as decorative adjuncts to a building, whether in the form of carving, inlay, or stained glass. There is a bold style about the London arms, with the dragon supporters, and the helmet and foliage in the crest; though the crest and supporters are said to be of no authority whatever. Edinburgh is a striking design, though the woman and the hart make a very bad balance in a decorative sense; the motto, "Nisi Dominus Frustra," has that pithiness of expression which belongs to a good Latin motto, though it is difficult to trace any relation between it and the design. Generally speaking, one does not find much that is striking or suggestive in the ancient mottoes of our city arms; nothing to compare with the poetically suggestive one of Paris, the ship with the inscription "Fluctuat Nec Mergitur." The London "Domine Dirige Nos" is no doubt a good, wholesome, religious motto, but it lacks distinctiveness. Of the special features in the old blazonry, it may be observed that the ship and the castle are favourites, and that both, properly treated, lend themselves very well to heraldic design. One of the most singular and illogical of the modern (or at least unauthorised) devices is that of Strabane; below, a man rowing a boat; above, a castle balanced on the turrets of two others; motto, "Concordia Crescit." A more unmeaning jumble it would be difficult to find. Bath, a very simple escutcheon, is one of the best in regard to decorative effect and significance; masonry with a battlemented finish occupies the lower half of the field, wavy lines significant of water, the upper half; an upright sword crosses and unites the whole. This is an old design (date not given), and its simplicity and decorative effectiveness are worth the attention of the compilers of modern escutcheons.

There is a good deal of curious information in the encyclopaedic portion of the book, in which we observe that the descriptions of all the genuine or authorised armorial bearings are given in Roman type, and those of the unauthorised ones in italics, so that the reader can distinguish between them at a glance. The large collection of engravings will be very useful to architects for reference, in designing decorations in which this class of object is to be included.

#### NOTES.



E print on another page a very plainly-worded letter from Mr. T. G. Jackson, A.R.A., on the subject of that insulting practice on the part of tradespeople and manufacturers of offering commissions to architects to use their goods, against which we have protested again and again. We recommend Mr. Jackson's letter to the attention both of tradesmen and architects. Mr. Jackson states plainly that he keeps a list of all who have made such offers to him, and takes care that they shall never be employed on any work of his. If all architects would do the same, the mischief would have been stamped out long ago. It is obvious that they do not all do so, as manufacturers would not go on sending about such circulars if they never got any response to them. Mr. Jackson's letter will at all events, it is to be hoped, prove to the latter that they had better choose their men a little

more carefully, and that they are running very considerable risk to their own interests in sending out such circulars broadcast among architects. The essential immorality of the procedure (which some tradesmen appear unable to understand) is that the architect is engaged to look to the interests of his client, and the tradesman who offers him a commission is bribing him to act in the tradesman's interest instead of in the client's. The thing only needs to be put in that way to show that it is a proceeding that must be contemptible in the eyes of every honourable man; and it is to be hoped that this outspoken letter of Mr. Jackson's will have some definite effect in checking the practice. While on this subject we may refer also to another and more spacious way of alluring architects into occupying a questionable position, by giving them a preference in the allotment of shares of companies interested in building materials. We have a circular before us now, issued a few weeks ago by a large firm of ventilating engineers, "of London and Glasgow," addressed to architects and marked "private," and stating that they are desirous to give their "friends" the first chance of securing the preference shares in their company, &c. The expectation of course is that architects will take shares, and will then serve their own interests and the company's at the same time by specifying the company's goods. One architect to whom this circular had been sent forwarded it to us with a strong comment. We can only recommend architects, if they wish the profession to be honourable, to put all such share invitations in the fire.

THE annual meeting of the subscribers to the British school at Athens on Wednesday, while it gave evidence of much useful work going on, and of the interest felt in such work by a minority of the more educated portion of Englishmen, again brought into notice the discreditable indifference of the English Government towards all archaeological enterprise. The French and German schools at Athens are each subsidised by their Governments; the French school enjoys an income of 3,000*l.* a year, while it is with difficulty that we can find 450*l.* a year to keep the British school going. How long is this discreditable state of things to continue?

THE meeting at the Mansion House on Friday last week, under the auspices of the "City Church Preservation Society" to protest against the destruction of City churches, was very well attended, and, as might be expected, very unanimous, since people do not take the trouble to attend such a meeting unless they approve of its purpose. It was, however, essentially a meeting of churchmen, and it is difficult to suppress a smile at the assumption made by all the speakers that the Church of England point of view was the only possible or existing point of view in relation to the subject. This narrowness is bad for their cause, as in fact there are a great many people of other religious denominations than those of the Church of England who would nevertheless sympathise in the desire to preserve the City churches; and if the society in question addressed themselves more to the purely architectural interest of the question they would be likely to get a wider support. We may note however, inasmuch as one of the arguments for destroying the churches is that they have no congregations, that some very conclusive statistics were given by one speaker in regard to the numbers of communicants at certain churches on Easter Sunday in the present year, compared with the recorded numbers on the same day about fifteen or twenty years ago. We did not take a note of the precise numbers, but they were somewhat in the general proportion of four or five at the earlier date to about 150 at present. This of course shows that there is a renewed practical interest in the City churches, as places of worship, to which every weight ought to be given. The Rector

\* Gules charged with three snakes festively passant.



of St. Nicholas Cole Abbey, however, touched on an argument of wider application when he remarked, in the course of an excellent speech, that these old churches were, even to those who did not wish to use them for actual religious worship in the ordinary sense, places available for a brief rest and escape from the turmoil of daily life in a great city. That idea would appeal to many people beyond the pale of the Church of England. There is a further suggestion which might be made, though we fear it would shock the feelings of the City Church Preservation Society—viz., that where from exterior circumstances a church has ceased to be available or useful for the object of public worship for which it was originally built, it is a perfectly practicable course to secularise the building and utilise it for some such purpose as a museum, rather than destroy a fine building in response to a cry that it was useless. That would at least be better than pulling it down. On the architectural ground we are entirely in sympathy with the object for which the meeting was called; we only think the Society should cast its net wider for support. The recent proposal to pull down such a building as St. Mary Woolnoth, one of the most interesting and charming interiors in London, rather than clear out the remains which had rendered it insanitary, we regard as perfectly contemptible. Such buildings are records of one of the most interesting phases in the architectural history of this country, which, once destroyed, no power can replace.

AN attempt was made in Committee of the Finance Bill on Tuesday to exempt works of art from the new death duties, but was quite unsuccessful. We confess that, property has to be taxed, we can scarcely see why works of art should escape from taxation. They are collected very often merely as investments, and we are doubtful whether the act that duty has to be paid on them at the owner's death will make him any the less anxious to collect them. It is also obvious that would not be easy to draw a distinction between works of art and money left to be expended on works of art. The demand is a plausible but not a sound one.

THE death of Sir Henry Layard removes one of the most prominent and fortunate of the older school of English archaeologists in the present era. Few explorers in the present day can hope for such a striking and sensational success as that which rewarded his explorations in Assyria, and which have connected his name for all time, one may suppose, with the remains of the mystical sculptures of Nineveh which he brought to light. There are new successes in store for diligent archaeologists, no doubt, but it hardly likely that at the present day anything remains to be discovered so remarkable, and of such peculiar and striking interest as this. Layard had the sagacity to select a site of great promise and previously unexplored, and his archaeological ambition received a reward probably beyond his fondest expectations. It is worthy that in his case, as in our own, it was only with the greatest difficulty, and only after long delay, that the Government of his own country could be moved to anything to assist the explorer, either by money or means.

THERE has recently been something almost farcical about the proceedings of the Coal Trade Conciliation Board, and no other childish tactics have been resorted to by a section of its members. They have, to use a parliamentary phrase, shown a disposition to "take advantage of the forms of the House," in order to evade the discussion of unpalatable subjects. Fortunately, however, this peculiar method of procedure has led to no rupture, and a business meeting of the board will take

place on the 19th inst., presumably to decide whether the state of trade warrants any alteration in the rate of wages, the result of which will be awaited with interest. While the deplorable state of things occasioned by labour disputes in America tends to make us a little less unwilling to "bear the ills we have," the remembrance of past strikes in this country should be an incentive to every member of a conciliation board to do his part towards making the body with which he is connected, worthy of its title. The Scotch coal strike seems to have excited comparatively little interest in England, although it has really assumed extensive proportions. This may be accounted for by the fact that a considerable quantity of coal is being sent into Scotland from this side of the border, and is doubtless partly due to the dramatic nature of the incidents daily recorded in connexion with the great American labour war diverting attention from the quieter struggle nearer home.

THE return recently published showing the great number of accidents which have taken place in Rotten-row has attracted some public attention. These accidents have been largely attributed to bad horsemanship, but in most cases, though this may be the proximate cause, yet the true cause is the bad state of this ride. The construction is of such a nature that it is treacherous for horses. In places it is rotten and in holes. In other parts it is hard and lumpy. The horse-raking which goes on, though it gives an apparently level surface, is calculated to make the trap more deadly, since it gives riders a false security. An old gentleman who would not think of entering the hunting-field, supposes that he may jog about the Row in safety; his horse strikes his foot against one of the hard lumps, or places it in a sticky hole, which retains it sufficiently to cause the animal to blunder on to its nose, and of course the rider falls off, and from his very age receives a severe physical shock, even if he breaks no bones. The fact is, that if there is to be a public ride, it should be constructed on sound principles, and be a place where persons may obtain their exercise in safety. In wet weather the Row is worse than a clay lane in Cheshire, which is about the worst specimen of a highway to be found in this country: a proper construction should allow it to be comparatively dry even in wet weather, without, of course, being hard. If the Office of Works demur to any improvement on the ground of expense, we do not think it would be an unreasonable thing to make those who use the Row pay for it in part. It is the resort of a comparatively limited number, who are well to do, and who could easily afford to pay something for the privilege of using this portion of Hyde Park for horse exercise.

ACCORDING to Dr. R. Bruce Low's Report to the Local Government Board on an outbreak of enteric fever in the Urban Sanitary District of Shildon and East Thicky, in the County of Durham, tells the usual tale of bad drainage and faulty disposal of refuse. The district was sewered by pipe sewers in 1878, but some of these have been badly laid. Nearly all the sewer ventilators on the roadways, more especially at New Shildon and East Thicky, have been gradually covered up during the last few years owing to local complaints as to smells at times issuing from them. The sewers have consequently had of late little or no ventilation. There is a separate drainage system for the surface water from the streets, but in numerous instances house drains have been connected with this system, and it is admitted that sewage gains access to the surface water drains which discharge into adjacent watercourses. These watercourses run through all parts of the district. They have been covered in, and culverted over in many places, and houses have even been built over them. Yard gulleys are

frequently badly trapped, or not trapped at all, and it is quite common to find the yard gully situated immediately underneath the window of the pantry in which the food supplies of the family are kept. Excrement and refuse disposal is chiefly by means of large, deep, uncovered midden privies, situated in back yards and often in proximity to dwellings. The bottom of such middens is seldom paved or made water-tight. In emptying some of them it is found necessary, owing to their position, first of all to throw out the contents by spade into the yard, or upon the sidewalk, thus polluting the surface and creating nuisance. As in other colliery districts, a large amount of refuse consists of unburnt coal and large ashes which swell the bulk of the midden contents and add materially to the labour of removal. The refuse is carted away by the *employés* of the Local Board to tips in the neighbourhood, or is spread by farmers upon land in the vicinity. Owing to the amount of ashes in the refuse it is not much in demand as manure, and consequently it is given away, whenever possible, to farmers or any others who will accept of it. Large quantities of this refuse, however, remain unused and huge heaps of it can be seen at different places just on the confines of the district. Dr. Low, however, attributes the prevalence of disease in the district mainly to the unventilated state of the sewers, and the defective traps and gulleys, through which sewer air forces its way under certain meteorological conditions.

THE townsfolk of Wolverhampton have just celebrated the nine-hundredth anniversary of St. Peter's, formerly St. Mary's Collegiate Church, which represents the religious house founded by Wulfruna, daughter (or sister) of Ethelred at Hampton on, as is said, the site of a pagan temple built by Wulfere, a son of Penda, King of the Mercians. In Henry III.'s reign the church was enlarged and its patronage changed to that of St. Peter. Some authorities say that in the reign of Edward III. the then existing church was taken for a choir, and a nave and tower (at the cross) added. In a report made for the Ecclesiastical Commissioners Mr. Ewan Christian writes:—

"I think . . . that the south aisle and western nave walls together with those of the lower part of the tower, and south transept, enclosed a church no part of the interior of which is now standing."

He goes on to say that the lower part of the tower, and the aisles are Late Decorated. In accordance with them Mr. Christian designed his new work for rebuilding the chancel or choir. The tower, in four stages, has angle-buttresses, ending in crocketed pinnacles, with ogee windows in the upper two stages, and pannelled battlements. Of the bells, seven were cast in 1698, the great bell, by Henry Bailey, in 1740. The chancel had been rebuilt, with the deanery house, in 1682-4, the fabric having been greatly damaged during the Commonwealth. Edward IV. united the deanery with that of Windsor; Edward VI. bestowed the collegiate revenues upon the Duke of Northumberland, but his successor restored the collegiate establishment, and James I. confirmed its union with Windsor, which continued until the death of Dr. Hobart in 1846, the last Dean of Wolverhampton. Five years later the revenues were vested in the Ecclesiastical Commissioners, who gave 4,000*l.* towards the restoration, on which about 25,000*l.* were spent. In 1610 the Merchant Tailors' Company of London built a west gallery for the Grammar School founded here by Sir Stephen Jenyns, Knight, Alderman of London.\* St. Catherine's, or Lane's, chapel contains monuments to Colonel John Lane, of Bentley, the noted Royalist, and others of that house. In the chancel is the statue of Richard Leveson, who served under Drake and at the defeat of the Armada: its pedestal was destroyed.

\* Founded 1513. Here were educated Sir William Congreve, and John Abernethy.



line or limiting angle of 63½ degs. shall start from the level of the ceiling of the ground-floor storey instead of the level of the pavement in front.

Clause 34 gives to the Council power to control over the plans for dwelling-houses to be inhabited or adapted to be inhabited by persons.

control over the plans for dwelling-houses to be inhabited or adapted to be inhabited by persons





of the working classes erected after the commencement of the Act not abutting on a street, with liberty of appeal from the refusal of the Council to sanction the plans or against any of the conditions prescribed by the Council to the tribunal of appeal.

*Clause 38.—Saving for Certain Domestic Buildings on Old Sites.*

The clause would appear to apply to every case of rebuilding throughout existing London, and provides that when any person intends to erect a domestic building (not a dwelling-house) to be inhabited by persons of the working class abutting upon a street, on the site of a domestic building existing at the commencement of the Act, or on a site then vacant, but which has been occupied by a domestic building at any time within seven years previously:

It shall be lawful for such person before commencing to erect the intended domestic building to cause to be prepared plans showing the extent and height of the previously existing building in its several parts, and may cause such plans to be submitted to the District Surveyor, who, if reasonably satisfied of their accuracy, shall certify the same under his hand.

Such person may then erect the intended domestic building, but so that no land shall be occupied by the newly-erected building except that which was occupied by the previously existing domestic building as so certified, and that such newly-erected building shall be in no part of a greater height than the height hereinafter prescribed.

If such person should fail to submit such plans to the District Surveyor, or the District Surveyor, or the Council, or the Tribunal of Appeal decline to certify the accuracy of the same, he shall, in rebuilding, be bound by the preceding provisions of this part of the Act relating to domestic buildings abutting upon a street formed or laid out before the commencement of the Act.

If a deviation is desired in any respect from the plans certified by the District Surveyor, the Council shall sanction such deviations, on such conditions as they may think fit, provided such

conditions do not in any case exceed the conditions prescribed for new dwelling-houses abutting on a street formed or laid out before the commencement of the Act.

In the case of new streets over old sites, or the widening of existing streets, the Council to have certain dispensing powers.

A person dissatisfied with any decision of a District Surveyor under this section may appeal to the Council, who may make such order as they may think fit, and any person dissatisfied with any such order may appeal to the Tribunal of Appeal.

*Clause 42*, in terms similar to the existing law, limits the height of buildings to 80 ft., which thus becomes the prescribed height before referred to.

*Clause 43* enacts that after the commencement of the Act no existing building on the side of a street formed or laid out after the 7th day of August, 1862, and of a less width than 50 ft., shall, without the consent of the Council, be raised, and no new building shall, without the consent of the Council, be erected abutting on any such street so that the height of such building shall exceed the distance of the front or nearest external wall of such building from the opposite side of such street.

The Tribunal of Appeal, by which almost every contested question arising under the Act is to be decided, is to be constituted as follows, by three members:—One appointed by a Secretary of State, one by the Council of the Royal Institute of British Architects, one by the Council of the Surveyors' Institution. Thirteen clauses (163–175) are devoted to the constitution and procedure of the Tribunal.

The consolidation of the existing law in one enactment will be a great public advantage, and in many particulars the experience of its working has led to the introduction of advantageous amendments:

But probably the renewed consideration which Parts I. and IV. will receive in the House of Lords may lead to further amendments therein. July 9, 1894. A. C.

*NOTE.*—When the Bill is again reprinted, the numbering of the clauses above given will probably be altered.

#### OLD HOUSES, POUNDS BRIDGE.

This view of a group of half-timbered houses at Pounds Bridge, near Penshurst, is from a sketch by Mr. E. B. Lamb.

#### MAGAZINES AND REVIEWS.\*

THE *Art Journal* is an interesting and varied number, though we do not know exactly what Mr. Gosse is driving at in his articles on "The New Sculpture," or what school of sculpture he precisely means to define. Mr. Gosse used, we believe, to declare that Mr. Tinworth was the greatest genius in sculpture of the day, a critical opinion which hardly inclines one to feel much confidence in his judgment. An unsigned article is devoted to a defence of "South Kensington and its Expenditure on Art." Mr. G. A. T. Middleton writes a short article on "Architecture at the Royal Academy," and Mr. R. A. M. Stevenson one on the Royal Academy generally. M. Duret contributes an article, very fully illustrated, on "Degas and his Works." An illustrated article on "The Work of Birmingham Silversmiths," by Mr. O'Fallon, gives hope that Birmingham work is looking up in style.

In the *Magazine of Art* the question of the opening out of Westminster Abbey is considered, and the effect on the building, with the conclusion that in any case the projected new chapel could never appear as part of the Abbey, and burial in it would not be accepted as burial in the Abbey. So we believe; then why build it? The *Magazine* prints a paper read by Mr. Brett before the Art Workers' Guild, in ridicule of Raphael's cartoons, a paper not creditable as a whole to the writer of it, though there are no doubt some truths in it. People bow down before the cartoons in this country in the same unreflecting way that they bow down before Handel; nevertheless, the

\* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.



modern criticism will not obliterate Handel, and we do not think Mr. Brett will obliterate Raphael. The editor contributes a rather amusing sketch of "The Artist's Ghost: a Study in Evolution."

The *Studio* gets rather too scrappy in literary form, but is full of good illustrations of various kinds. For an article on Helle's etchings the editor has been fortunate enough to get reproductions of some of that remarkable artist's work. Mr. E. F. Strange has a well-illustrated article on "Sien-cilling as an Art"; Mr. G. Frampton's article on "Colouring Sculpture" concludes with the rather doubtful suggestion that coloured bas-relief is an opportunity for the man who has not that totality of gifts which would make him exclusively painter or sculptor.

The *Fortnightly* contains an article by Mr. Claude Phillips on "Fair Women at the Grafon Gallery," in which a good many doubtful authenticities and doubtful nomenclatures are dismissed with costs.

In the *Nineteenth Century* Sir F. Burton deals with the new evidence as to the authenticity of the Leonardo da Vinci picture known as "The Virgin of the Rocks," and now in the National Gallery. He considers the authenticity of the picture to be now thoroughly established, and deals pretty sharply with some foreign critics who have maintained the opposite view. In the same magazine Mrs. Sidney Webb writes a somewhat angry article on "The failure of the Labour Commission," a failure which seems chiefly to consist in the fact that the commission has not deduced results favourable to Mrs. Webb's own social theories.

The *Century* contains no less than three of those topographical articles to which American magazines are so partial: "Coasting by Sorrento and Analf," by Mr. Marion Crawford, "The high road from Salerno to Sorrento," by Mr. J. H. Adams (both with illustrations by Mr. Harry Fenn), and "Across Asia on a Bicycle," Part III. The same number contains also "The evolution of a battle ship," a practical description of the construction of a man of war, by Mr. A. F. Matthews, and an article by Mr. Albert Shaw on "What German Cities do for their Citizens," an analysis of the municipal work of a German town. Among more directly artistic subjects is an article on Ruisseld, by Mr. Timothy Cole, one of the series on old Dutch masters; another on the "Fliegendeblatter," with illustrations from that rather overated journal; and an article on "Painting at the Fair," by Mr. J. C. Van Dyke, a last talk (one hopes) about that eternal Chicago Exhibition, which however contains some good critical thoughts about the state of contemporary painting; and if the writer hopes great things from the future of American art, he is not blind to the fact that at the present moment all that is good in that art is but a replica of Paris or Munich. It is something to find an American critic admitting that.

*Scraper* contains an article, illustrated by plans, on "The New York Tenement House Evil and its Cure," by Mr. Ernest Flagg, according to whom "the greatest evil that ever befell New York was the division of the blocks into lots of 25 by 100 ft.," which apparently has led to the repetition of a stereotyped form of plan that has little to recommend it. The difficulty has arisen, says Mr. Flagg, "owing entirely to our lack of knowledge of the art of scientific planning." Certainly the device of living-rooms opening on to an often very narrow central well does not look promising for sanitary conditions. The principal remedy the writer considers to lie in official regulations for space at the side of and between such buildings, whereby they may not be compelled to obtain their light and air from central shafts. "The French in Holland," by Mr. Hamerton, is really an article on François Flameng, apropos of an engraving from his picture under that title.

The *English Illustrated* contains an article on "Lincoln's Inn Fields, Past and Present," by Mr. Robert Hunter, with illustrations by Mr. Holland Tringham, and one on "Tapestry," with illustrations from photographs, by Mr. Alan Cole, which, as may be expected, is a useful article both in the practical and artistic sense, though the writer must be surprised at the company he finds himself in. The illustrations to one or two articles, "Reminiscences of Childhood," for instance, are of a sheer vulgarity which is a disgrace to the magazine which publishes them.

In the *Gentleman's Magazine* Mr. N. Wynn Williams writes a short article on the Catacombs of Paris, giving an account of a visit to them. A short story called "The Artists," translated from the Russian, is a striking literary commentary on some aspects of modern art.

*Harper* includes an article on "The United States Gun Factory," by Commander Jewell, U.S.N., with illustrations of some of the processes of manufacture. A short article on "The storage battery of the air," by Mr. A. McAdie, contains an account of some experimental observations on thunderstorms and their effect on the condition of the atmosphere, carried on some years ago from the top of the Washington Monument.

In the *New Review* M. Chérét, Mr. Dudley Hardy, and Mr. Aubrey Beardsley, write a kind of triple article on "The Art of the Hoarding." Of the contribution of the latter of the three, the less said the better; and if Mr. Hardy dignifies by the name of art such productions as the poster of the "Gaiety Girl," and some other impossible travesties of female figures which accompany his remarks, it is to be hoped he will find few to agree with him. M. Chérét makes less pretence at being serious, with more *verve* and originality, though he by no means escapes vulgarity. His remarks on the importance of the design of the lettering in an advertisement are to the point. In an article on "Municipalities at Work," Mr. F. Dolman gives some account of the work of improvement in Birmingham of late years, and as the article is numbered "I," we presume similar articles on other cities are to follow.

In the *Atlantic Monthly* "The City on the Housetops" is a curious sketch of life as seen from the attic windows of an American city. "The Home of Glooscap" (whatever that latter word may stand for) is a picturesque article by Mr. F. Bolles on the landscape and incidents of scenery and life on apparently a wild part of the American coast facing Newfoundland.

In *Macmillan's Magazine* Mrs. Steel, the author of some of the best Anglo-Indian stories written of late, has a short sketch "A Bit of Land," portraying with a great deal of good humour the difficulties of a native village surveyor in conducting an accurate map of the holdings in connexion with his village, by a system of chaining the lots separately and piecing them together on the map. For the result we refer the reader to the story.

In the *Contemporary Review*, Professor Bonney asks the question, "Do glaciers excavate?" and answers it in the negative, in opposition to the views of Professor Wallace. Not that Professor Bonney altogether denies the erosive action of glaciers, but maintains that it has been much exaggerated, and that effects have been attributed to it of which it is incapable. Mr. Phil Robinson, in the same magazine, writes a very pleasant and picturesque article on "Hamstead Heath," and Mr. A. D. Provand, M.P., treats of "Employers' Liability" in the popular strain of favour to the artisan. He observes, for example, that on the Forth Bridge the proportion of accidents to the number of men employed was very high, although the wages were not much above the average; but has he taken any steps to ascertain how many of these accidents were due to recklessness, carelessness, or drunkenness? No doubt undertakings like the Forth Bridge and the Manchester Canal (which is another example cited) leave much greater chances to workmen to kill and injure themselves, through sheer carelessness, than occur in ordinary life; but how many of these accidents are there which are not really preventable—accidents which never need have or ought to have happened, had proper caution been exercised by the men? We must have a statistical answer to that question before we can estimate the significance of this kind of evidence.

In *Blackwood* "Six Weeks in Java," by Colonel Collett, gives an interesting description of the country.

The *Antiquary* and the *Reliquary* contain the usual amount of matters of archeological interest, without inviting any special comment.

MIDDLESBROUGH BUILDING LINE CASE.—At the Middlesbrough Police Court, on the 4th inst., Mr. C. J. Coleman, Stipendiary Magistrate, gave his decision in the case of the Corporation of Middlesbrough against J. S. Scott, builder. Defendant, after written notice from the Corporation, allowed a wooden building in Linthorpe-road to remain beyond the front main wall of the house on the south side, and the Corporation now sought for the enforcement of the penalty against defendant. The Stipendiary said he had decided to convict defendant, and ordered him to pay 10s. per day from the 18th to the 25th June, and also pay the costs.—Mr. Parrington asked that execution might be stayed in order to give an opportunity of appeal.—Mr. Bainbridge, Town Clerk, said plenty of time would be given Mr. Scott if he wished to appeal.

## COMPETITIONS.

BOARD-ROOM, &C., KIRKHAM.—The competition for Board-room, Union offices, and receiving wards, to be erected near the Union Workhouse at Kirkham, has just been decided. The 1st premiated design is by Messrs. Heywood & Harrison, Commercial Chambers, Accrington; 2nd, Messrs. Weaver & Rowbotham, Guildhall-street, Preston; 3rd, Mr. E. J. Andrew, Lime-street, Preston.

LAYING OUT GROUND, BRISTOL.—The competition for laying out the ground between St. Augustine Bridge and the stone bridge, Bristol, as an open space, has resulted as follows:—1st premiated design, Messrs. W. J. Taylor and H. J. Weston, Assoc. M. Inst. C.E., 24, Portland-street, Southampton. 2nd, Mr. Edward Stoddley Sinnott, Assoc. M. Inst. C.E., Bristol. 3rd, Mr. Thomas H. Mawson, (garden architect), Windermere and Market Drayton.

SCHOOL, SOUTHEAST-ON-SEA.—The Southend School Board having decided to build another school situate on the Leigh-road, invitations were issued to architects practising within the borough for designs in competition. Mr. F. W. Roper, A.R.I.B.A., was engaged to advise the Board upon the plans and specifications. As the result of Mr. Roper's report, it was decided to adopt the designs submitted by "Knowledge," subject to any modifications required by the Board. The author of these plans is Mr. W. Vendall Hobbs, architect, of Southeast-on-Sea. There were four other competitors.

## THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

*Electric Light Installation for the Embankment, &c.*—In a report by the Highways Committee on the electric light installation for the Victoria Embankment and Westminster and Waterloo Bridges, it was stated that it was desirable that the supply of machinery and plant should be the subject of two separate contracts, and that, having regard to the scheme of the electric light installation being completed and in operation before the end of the year, tenders should be invited without any avoidable delay, and they recommended accordingly.

This was agreed to.—Mr. Roberts moved—"That in the opinion of the Council designs should be obtained for the electric lamp standards to be erected on the Victoria Embankment; and that it be referred to the Highways Committee to take the necessary measures for the purpose, and to advise the Council what premium should be offered for the best design."—He thought that if they advertised they would have some of the best artists in the country competing, and that the President of the Royal Academy might be asked to adjudicate. By that means he thought they would get a design worthy of London.

Mr. Powell seconded the motion, which was carried.

*Shaftesbury Memorial Fountain.*—The Improvements Committee reported that, as instructed by the Council, they had experimented in connexion with the supply of water for the Shaftesbury Memorial Fountain. The experiments had clearly proved to them that even under most favourable circumstances the site at Piccadilly-circus was not a suitable one for any large spouting fountain, and they felt that, without stopping the water supply entirely, the only way to prevent the Shaftesbury fountain from becoming a nuisance was to arrange for the water to flow from the lower portion only. By adopting that course the memorial would still be a fountain not merely in name but in reality, and, as drinking-cups were provided, they believed that the fountain would prove to be a considerable boon to the public, especially during the hot weather. They recommended—"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the Statute, arrangements be made for the working of the Shaftesbury Memorial Fountain for an average of ten hours a day." The Committee further recommended that the block of stone bearing an inscription to Lord Shaftesbury be removed, and that the offer of Messrs. Broad & Son to cast an inscription in bronze slips and to place it upon the faces of the fountain on the large chamfer immediately above the lower basin be accepted.

Mr. Campbell moved that the recommendation be referred back. This was seconded by Mr.

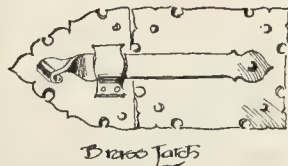
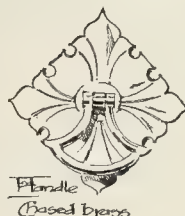
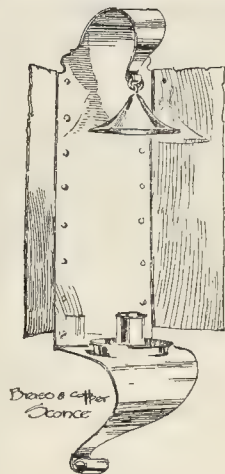


Jones; but, upon a vote being taken, was lost, and the recommendation was agreed to.

The Council adjourned soon after seven o'clock.

#### A CEREMONIAL KEY.

The key illustrated is that with which the Princess of Wales opened the Home for Incurables at Streatham a few days ago. It was specially designed by Mr. F. Stuart Murray, architect, and though simple, it is a better design than many more pretentious keys that we have seen produced for such occasions; the handle affords a good hold for the hand, and there is none of that aimless imitation of architectural forms which we too often meet with—the shank of the key taking the form of a column, &c. The key was made by Messrs. Jas. Hill & Co.



#### SKETCHES AT THE "SOCIETY OF THE QUEST" EXHIBITION, BIRMINGHAM.

The accompanying sketches show some simple but well-designed objects which were at the exhibition of the above-named society—a kind of arts and crafts guild—held in Birmingham a week or two since. Some mention of the exhibition was made in a "Note" in our columns, pp. 494-5, ante.

#### Illustrations.

#### CHRIST'S HOSPITAL SCHOOLS COMPETITION. DESIGN BY MR. T. E. COLLCUTT.

WE have already illustrated the selected design for Christ's Hospital Schools; in illustrating the others, with the exception of that by Mr. Jackson (who, as already mentioned, does not wish his design to be published), we have considered that the only way to render them useful and to do justice to their authors is to devote the illustrations in one issue entirely to one design, so as to give a general idea of it, and enable our readers to study it as a whole conception. We devote this number accordingly to Mr. Colcutt's design, and will devote other future numbers to those of Mr. Ingelow and Messrs. Paley & Austin respectively.

The general aim kept in view in Mr. Colcutt's design will be best explained by the following quotations from his report sent in with the drawings:—

"After careful consideration of the requirements contained in your instructions, I am of opinion that for the convenient working of so large a school it is most desirable that the various buildings be compactly arranged as one large whole; at the same time the importance of a perfectly free circulation of air and ample light should be very carefully considered.

By a judicious concentration of plan the labour of supervision, the general work of the school, and the necessary daily cleaning of rooms, &c., could be more conveniently and economically carried out than would be possible were the buildings scattered over a large area.

It will be seen by the block plan that the whole of the accommodation required (with the exception of the Infirmary and the Sanatorium) is devised to secure these objects, while the additional result is obtained of minimising the initial cost and maintenance of such matters as drainage, roads, fencing, and piping for water supply, heating, and electric lighting.

The general scheme of the arrangement of the buildings allows of easy inter-communication, and of ready and economical distribution of coals and other articles of daily consumption to the various houses.

The Schools.—These buildings occupy a central position in the general scheme, of which the Assembly Hall forms the prominent feature. The Hall is circular on plan, with the floor, like that of the pit in a theatre, inclining upwards from the platform, this being not only an advantage but a necessity, if the audience and those on the platform are to have a clear view of each other. The superior acoustic properties of a circular form of room are acknowledged, and in no other can the audience be

so conveniently and advantageously seated. The Hall is surrounded by a very ample corridor, and has sufficient entrances for the rapid and easy assembling and dispersing of the boys. The Class-rooms, arranged round the corridors of the Hall, and having a northern aspect, are planned so that the window light may be on the left hand of the student. Urinals are provided in connexion with the schools; these are not demanded by the Instructions, and, of course, may be omitted should they not be required.

Science Schools.—These Schools also have a northern aspect, and the Laboratories have ample sky and wall light.

Drawing Schools.—Above the Science Schools are placed the Drawing Schools, with a northern aspect and top light. The grouping of the whole of the school buildings has been arranged so as to be readily accessible from the boys' houses, an obvious advantage in inclement weather. It has not been thought necessary to provide cloisters or covered ways between the various buildings, the great cost of so doing being a sufficient reason for the omission of the luxury of sheltered approaches. Cloisters would, perhaps, be convenient as playing grounds during the occasional breaks in the school hours, but simple covered sheds could be easily erected on the space between the houses and the schools to serve this purpose.

Library and Museum Building.—On the ground floor of the main entrance are rooms for the Governors, the Court-room, and the Clerk's and Visitors' rooms, besides a Reception-room for the Head Master. The Library and Museum, having top lights and approached by two staircases, are on the first floor.

Dining Hall, Kitchen, &c.—The Dining Hall forms one side of the large quadrangle, and is conveniently situated for easy and rapid service from the Kitchen. A Gallery is provided at the east end for the accommodation of visitors. The Kitchens and Servants' apartments, though in direct communication with the Dining Hall, are sufficiently disconnected from the school buildings.

The Chapel will seat one thousand persons. With a view to economising space, a Gallery has been designed for the use of visitors, the families of the masters, and for the domestic staff.

The Houses.—With regard to the request that alternative plans, showing a 'vertical' and 'flat' system of blocks of houses, should be submitted, after a very careful study and planning of the accommodation required, I think it will be found that there is practically only the difference of name to be obtained. The Instructions suggest that in a block of two or three houses one Matron will be sufficient; it is obvious, therefore, that the houses cannot be distinctly separated by party walls or otherwise, if the Matron and her servants are to obtain easy access from one house to another. In the plan numbered 19, showing a block of three houses, two of them are arranged on the 'flat' system, while the third house is on the 'vertical' system.

The plan numbered 25, showing a block of two houses, is arranged on the 'vertical' system, but it is apparent that by an opening in the party wall, the same plan would be available for the 'flat' system; the plan numbered 29 is so shown, and this has the advantage of occupying less space than the former plan. In plan No. 19 the Dormitories are circular, and are easily overlooked, both by the Master and the Prefect; this form of room has the advantage of obtaining sunshine during some portion of the day; but if the circular form for so large a dormitory be objected to, the alternative of a square plan can be easily arranged. The lavatories are in easy access of the Dormitories, and are protected from draught in the approach, while the natural ventilation is as complete as possible, windows being placed on either side of the room. The water-closets and urinals are quite secured from being objectionable by the short corridor with cross ventilation. The Masters' rooms are well placed for supervision; at the same time they are sufficiently private. The Day-rooms, Changing-rooms, &c., are, I believe, of ample size, and are easily reached from the entrance. The Married Master's house is placed so that it is not overlooked by the rooms occupied by the boys; at the same time, his study, bedroom, &c., are contiguous to the boys' rooms, and are convenient for efficient and frequent inspection of the houses. The Matron and servants are accommodated on the second floor of the Masters' house, but not communicating with it. Sufficient housemaids' closets, wardrobe and linen rooms are provided.

Infirmary and Sanatorium.—The planning of these buildings has received very careful attention and study, and I hope it will be found that not only has the required accommodation been provided, but that it is constructed on the latest systems, and that isolation, ventilation, and light have been sufficiently considered.

In both the Infirmary and Sanatorium, the windows are constructed on the sash system, with an upper part to open inwards for ventilation, the current of fresh air being directed towards the ceiling by means of a glazed hopper, as shown on the detail drawing; the lower sashes can also be opened to admit air by the meeting bars, this also being an upward current. The window-blind could be fixed to the top of the hopper, and made to pull down over the half-roll shown, so that the free admission of air, or the direction of the current, would not be affected by the closing of the blind.

Latrines.—These are provided in close proximity to the houses, and are arranged with a central passage for the convenient removal earth-closet trays.

Preparatory School.—These buildings are quite distinct from the main schools; at the same time they form a portion of the group, and must, of course, be within a convenient distance of the Dining Hall, which is served from the general Kitchen.

Music House.—Great attention has been paid to the proper isolation of the various practising rooms in order to prevent the sound travelling from one room to another. These rooms would have hollow



walls, the inside of which would be built of Clayton bricks, a material particularly non-conducting; and as a further precaution double ceilings would be provided. The walls and ceilings would be covered with plaster slabs screwed to pligs.

**Laundries.**—Some portion of the present buildings could be utilised for this purpose, and the plan is, I think, sufficiently explicit.

**Swimming Bath, Gymnasium, &c.**—It is suggested the present buildings should be altered and adapted for these purposes, and the plans show the manner in which this could be done. The remaining buildings could be utilised for five courts, gymnasium, and boys' workshops, &c.

**Water Tower.**—The Water Tower would be built adjoining the Laundry and Boiler and Engine houses. The tanks in the topmost story would contain 37,000 gallons of water, and it is proposed these should be kept always full, so as to serve the hydrants. The tanks immediately under would contain 37,000 gallons, and would be for domestic service. The supply would be pumped to the higher tanks, and an overflow pipe carried down—with proper ball-cock and tell-tale—to the lower tanks, thus ensuring the higher tanks remaining constantly full. Proper filters for the domestic supply would be provided. Through this Tower would rise the boiler shaft.

**Masters' and Officers' Houses.**—The position of these houses is shown on the key block plan. The plans will, I hope, sufficiently explain themselves.

**Heating and Ventilation.**—The Class-rooms, the Day-rooms and Dormitories, the smaller Dining-rooms, &c., will be heated by open fire-places, but this heat will be supplemented by hot-water coils or radiators, placed in the rooms where considered necessary, and in every case the corridors and staircases will be warmed. The Library, Museum, and Drawing-rooms, and other similar rooms, also the Dining Halls and the Assembly Hall, will be heated by hot water only, and in each separate block there will be a Heating Chamber in which will be placed a steam heater for the warming of the water in the coils and radiators. In the same Heating Chamber there will be a second steam heater for the purpose of making hot water for the service of the baths, lavatories, and sinks, by means of a circulating system. From the main boilers, previously described, a steam main will be taken, by means of a properly constructed duct large enough for workmen to pass along, to the different buildings as required, with branches connected to each separate heater, the condensed water being taken, through the duct, back to the main boilers for re-use. The Ventilation will generally be as described for the Infirmary and Sanatorium.

**Mode of Construction, &c.**—It is proposed that the whole of the buildings, excepting the Masters' and Officers' private houses, be constructed with fire-proof floors, corridors, staircases, and ceilings immediately under the roofs. The floors would be of rolled iron or steel joists, with concrete arching; the floors being laid with wood blocks or finished with granitic paving or mosaic. The Ceilings to the dormitories would be formed by the intrados of the floor arch, but the Ceilings of Class-rooms, wards, and other rooms, would have wood ceiling joists and plaster, as shown on the detail drawing of the Infirmary section. The Masters' houses, in connection with the residential houses, would also be fireproof. The desire to render all the buildings as secure as possible from damage by fire, has led me to design the Dining Hall and the Chapel with vaulted fireproof ceilings; this would, no doubt, add somewhat to the cost, but a simple arrangement of vaulting would be more effective than would a simple arrangement of open timber roof. These vaults would be constructed of stone and brick arching with concrete filling, and, of course, would be very much more lasting than any other form of roof. The Walls would be built of brick, with red brick facings and stone dressings; the roofs would be covered with green Westmoreland slates laid on boarding; the Joiners' work would be of oak, the first coat of which would be considerably greater than if of deal, but the expense of constantly painting would be saved. The Staircases would be of Yorkshire stone, especial care being taken to ensure the safety of the boys by sufficiently guarded handrails and balusters. They are mostly about 4 ft. 6 in. wide, any greater width rather adding to the danger of quickly descending. Glazed Bricks would form the dado to the dormitories and to the wards, and the whole of the closets, &c., would also have glazed brick facings. The Plastering generally would be Selenitic, but in the hospitals it should be fire-proof granite plaster. Generally, I have considered that the whole of the buildings should be constructed with the best materials of their respective kinds.

**THE EAST-END DWELLINGS COMPANY.**—The directors have declared interim dividends for the half-year ending June 30 last, at the rate of 4½ per cent. per annum on the preference shares, and at the rate of 5½ per cent. per annum on the ordinary shares. Satisfactory progress is being made with the new buildings near Stepney-green, and it is expected that they will be ready for occupation during the autumn of the present year. Building operations will probably be commenced on the new King's Cross site in the course of the next three months.

## Correspondence.

To the Editor of THE BUILDER.

### TRADE COMMISSIONS TO ARCHITECTS.

SIR,—You have from time to time noticed in your paper the practice of a certain class of manufacturers who try to induce architects to recommend their wares by the bribe of a commission. Like other architects, I am from time to time bombarded with proposals of the kind. I send you the latest, and take this opportunity of informing those who favour me with similar communications that in future I shall keep a list of them, and take care that under no circumstances shall any of their goods be used on any building over which I have control.

If other architects would do the same a stop might easily be put to this scandal.

THOS. G. JACKSON, A.R.A.

14, Buckingham-street, Strand, July 5, 1894.

\* The following is the communication referred to in Mr. Jackson's letter, and which in a subsequent letter he has asked us to publish:—

"COMYN CHING & CO'S

NEW PATENT

SILENT MICA FLAP CHIMNEY BREAST VENTILATOR.

SPECIAL DISCOUNT.

To T. G. Jackson, Esq., M.A., F.S.A., 15 per cent.

MONTHLY ACCOUNTS, 24 PER CENT. FOR

CASH WITHIN FOLLOWING MONTH.

STRICTLY NETT AFTERWARDS."

This appears to be a printed form for sending to anyone who is supposed to be influenced by a discount; the name, &c., which we have printed in italics, being filled up in writing in the original. Messrs. Comyn Ching & Co. will thus see that by the issue of this preposterous piece of paper they have lost the patronage of a leading architect. Perhaps the publication of it may act as a deterrent to others.—E.D.

### SEWER AND DRAIN VENTILATION.

SIR,—Mr. Buchan's sweeping assertion in the first par. of his letter, if true, would condemn as a bungler the engineer of every town where any difficulty has arisen with regard to sewer ventilation, and it is a notorious fact that very few have escaped this difficulty.

The members of my own profession are not free agents, inasmuch as Mr. Buchan's patent rat-trap obstruction has been legalised. This was done in the first instance on the advice of medical men, that the house should be isolated from sewer and drain-gas—very good advice—but the method of carrying it into effect by means of the interceptor trap is bad. The unpopularity of an argument is no proof whatever that it is wrong.

The fact that between twelve midnight and 6 a.m. there is less sewage and more air space in the sewer, does not mean that "an extra amount of sewer-gas is generated," as stated by Mr. Buchan, but, on the contrary, the sewage then consists chiefly of water wasting through rubbishy water fittings, and bad plumbing, and the sewer-air is in its most diluted condition, while the drain-air is being poisoned by the emanations from the 3 gals. of stagnant sewage, containing 35 per cent. of solid matter, retained in the interceptors.

I did not refer to the water-flow as "the chief agent in sewer ventilation," but, on the contrary, I agree so far with Mr. Santo Crimp that the wind is the chief agent in *producing* motion in the sewer air, but the direction of that motion is decided not by the wind, but by the water-flow as the "most permanent factor" inducing the air to follow it down the sewer. My letter is perfectly clear on this point, although Mr. Buchan may not be able to appreciate the difference between his statement and mine.

It is not an uncommon occurrence for the drain outlets to be covered by the water flowing down the sewer, but it is of short duration, and the air which has been forced through the interceptor is replaced by fresh air when the water in the sewer falls to its normal level.

Mr. Buchan affects to believe that my expression, "A good 'wash-down' pan and trap closet," means an old "pan-closet" or "pan and container" closet, this may be intended for a joke, but if so, it is too absurd, it is Mr. Buchan who has got them "mixed," not I.

Mr. Buchan has left my facts and arguments severely alone and unanswered, but as usual has gone off on a voyage of discovery amongst side issues and irrelevant matter.

R. READ,

City Surveyor, Gloucester.

July 10, 1893.

SIR,—My attention has only just been drawn to the discussion which has been going on in your columns

on sewer ventilation. As it is a question in which I have taken much interest for some years, I should, with your permission, like to say a few words in support of the abolition of the so-called interceptor. From my own experience, I can quite agree with Mr. Read, that these interceptors are a nuisance, and are in my opinion the weakest point in a house drain. I have generally found that if the drain does get choked, it is usually at the trap or interceptor. If we look the matter clearly in the face, how can we expect otherwise? In the majority of cases we have only a two-gallon flush, and again by introducing the interceptor the velocity must, to a certain extent, be broken and destroyed. For some time past I have in my own practice, in districts where I am not fettered by by-laws regarding interceptors, done away with them altogether, and made the soil pipes act as up-cast shafts, and placed air inlets over the crown of the sewer in the street in suitable positions—or in other words, made the soil-pipes act as main sewer ventilators. The object is to make the street openings act as air inlets, and the pipe shafts as outlets. But I have found this cannot always be relied on, except in certain situations. A great deal depends upon the temperature over the street grating and the temperature in the sewer and drain, and also the force and direction of the wind. The latter I have found to have a very material effect. As an instance, I may state that some time since I had occasion to test some house drains, and I found that when the sun was shining full over the street grating, and the pipe shaft in the shade, and the smoke test applied to the drain, the smoke came up through the street opening, and *vice versa* when the sun was in the opposite direction. I do not think myself that this will ever be success with surface ventilation only. What is wanted is a good supply of fresh air, and the more that can be got into a sewer the better. The question is, what is the best system to adopt?

If we still use the interceptors, it is quite evident that some means of keeping them clean and open must be employed, and this can only be done by having automatic flushing-syphons at the head of the house-drain. I have recently fixed one of Adam's automatic flushing-syphons, worked with clean water, at the head of a system of house-drains to a large building.

But I have been compelled to use the interceptor; the by-laws are against me; I saw what the consequence would be if I relied upon keeping the trap open with simply the ordinary flush and waste. A good system of flushing with clean water will do much towards assisting in ventilating if ample means are provided at suitable points for ventilating by means of up-cast shafts. Whether sewers or drains are well constructed or not, it is quite impossible to get a truly self-cleansing sewer. Gases due to fermentation must be present, for the reason that the portion of the sewer which is alternately wet and dry becomes more or less coated with fecal matter and grease, which must be removed by flushing with clean water only. I certainly see no reason why soil-pipes should not be utilised for ventilation of the main sewers. This could be done without interfering with the interceptor, or hurting the feelings of those who are so much attached to them.

To bear out my statement as to the interceptor, I may say that the system carried out by Mr. Waring in the town of Memphis, U.S.A., entirely agrees with those holding the same views as myself. Here 6-in. sewers were used in all side streets, and 9-in. mains, and I believe I am correct in saying that only 3-in. pipes for house connections. No traps or interceptors were used in the house drains, but he simply made the soil-pipes act as main sewer ventilators. Air inlets were placed in suitable positions, and in this manner, I understand, very good ventilation was got.

I cannot say that I agree with the 4-in. house connections. I consider 6 in. is the smallest diameter of pipe that should be used. CIVIL ENGINEER.

SIR,—If sewers and drains have not been sufficiently ventilated in your columns, I should be glad, thus late in the field, to add one word against a hasty condemnation of disconnectors, which I have always found to serve their purpose well, if properly made, fixed, and flushed out daily from an automatic flushing tank.

I fear that so many evils would follow the adoption of this simple method of solving the sewer ventilation question that the remedy would be found worse than the disease.

The evils which I anticipate would be mainly caused by the removal of the inlet ventilator to the house drain, which would be necessary to make the air from the sewer to pass up the outlet ventilator of the house drain.

The first evil would be the substitution of foul sewer air in the house drain for the fresh air which would be admitted through the inlet vent, which would increase instead of diminish the foulness of the house drain.

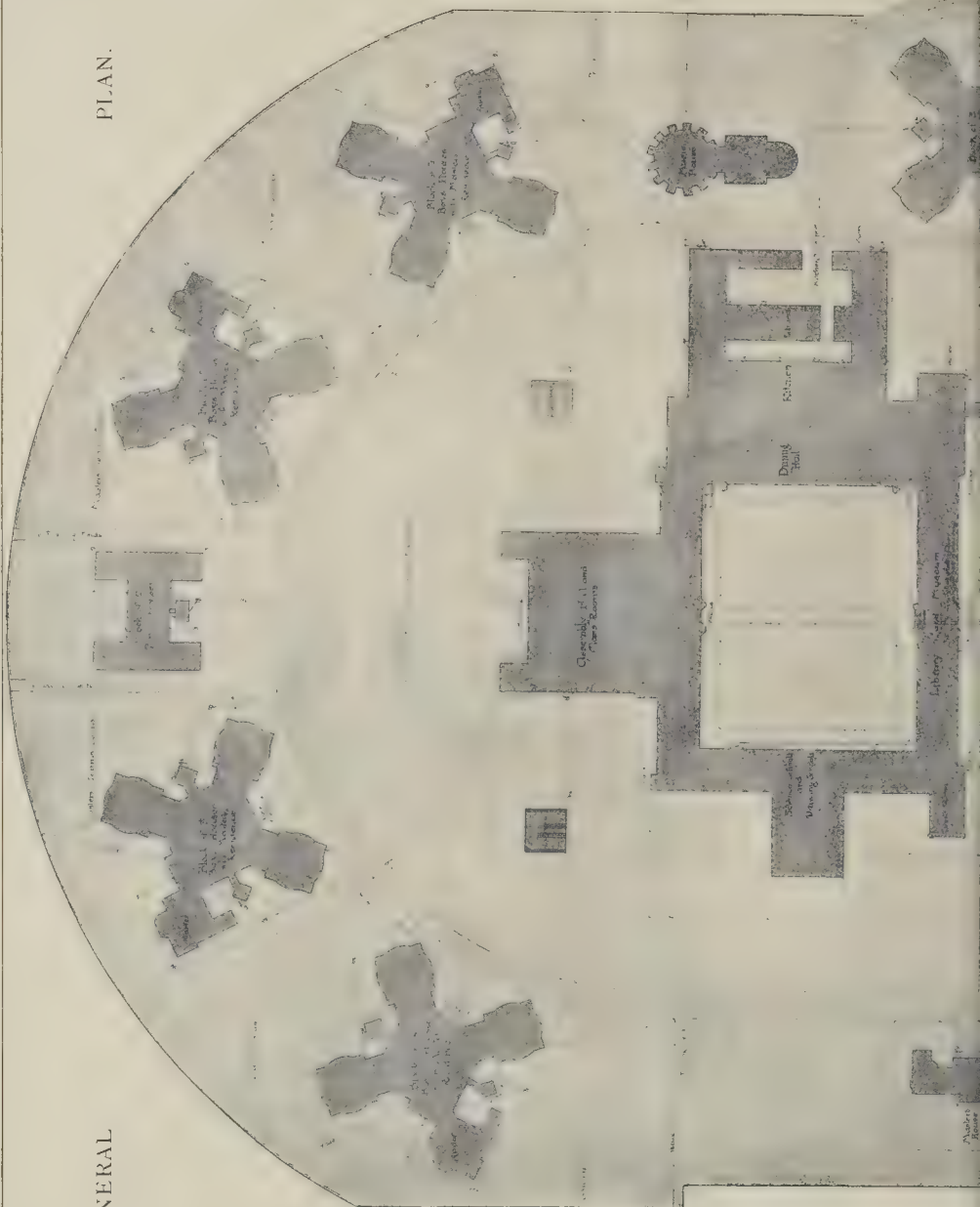
Secondly, this deterioration in the purity of the air in the house drain would increase the danger arising from faults in the pipes or fittings. With a strong current of fresh air passing from the inlet to the outlet ventilators, the chance of air passing from the drain into the house is minimised, but with a reduced supply of fresh air the current would be more sluggish and the drain air would be more





GENERAL

PLAN.





INK PHOTO SPRAGUE & CO 466 EAST HARDING STREET PEPPER LAKE I.C.







# CHRIST'S HOSPITAL.

## GROUND FLOOR PLAN

SCALE OF FEET  
0 10 20 30 40 50 60 70 80 90 100

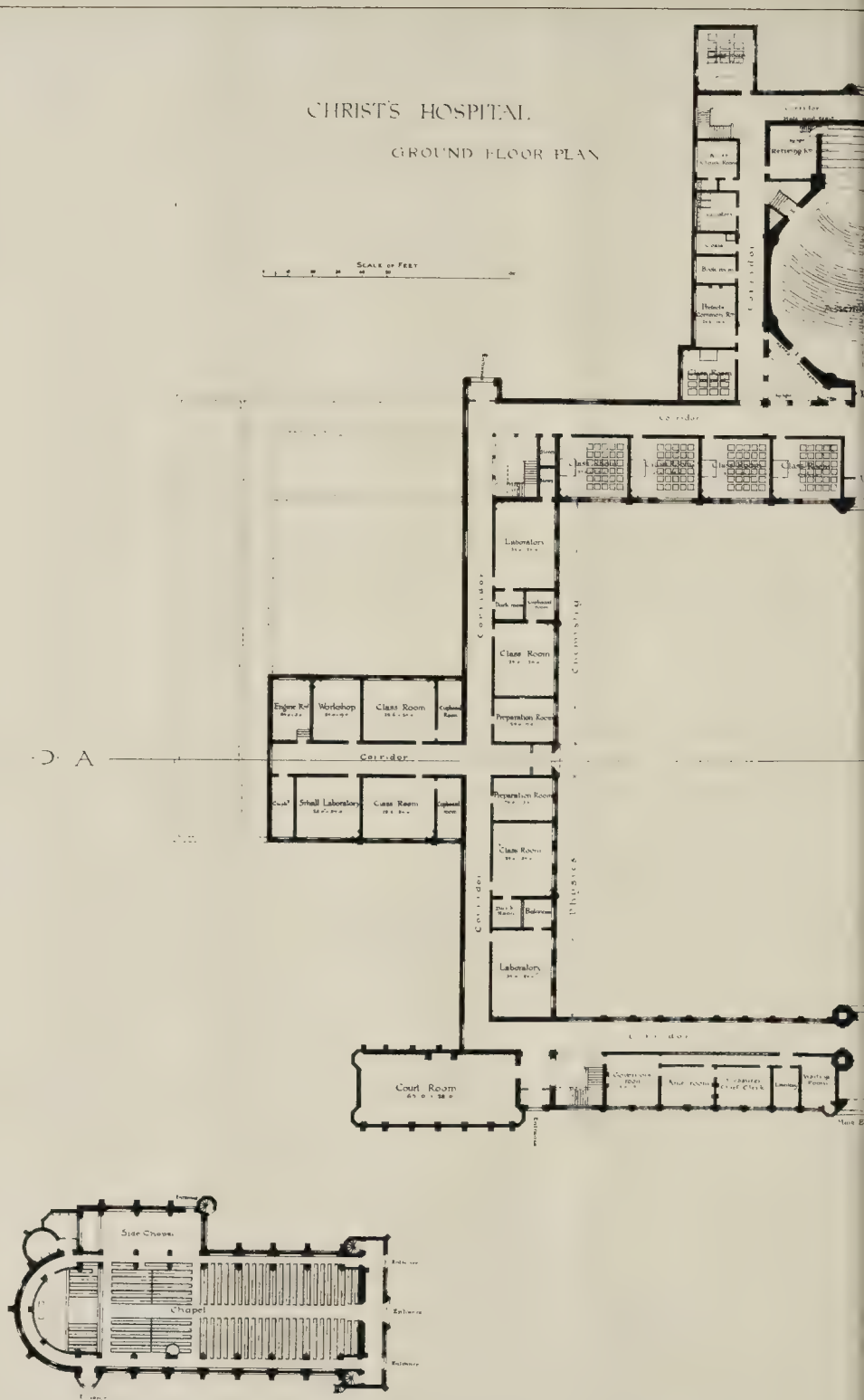
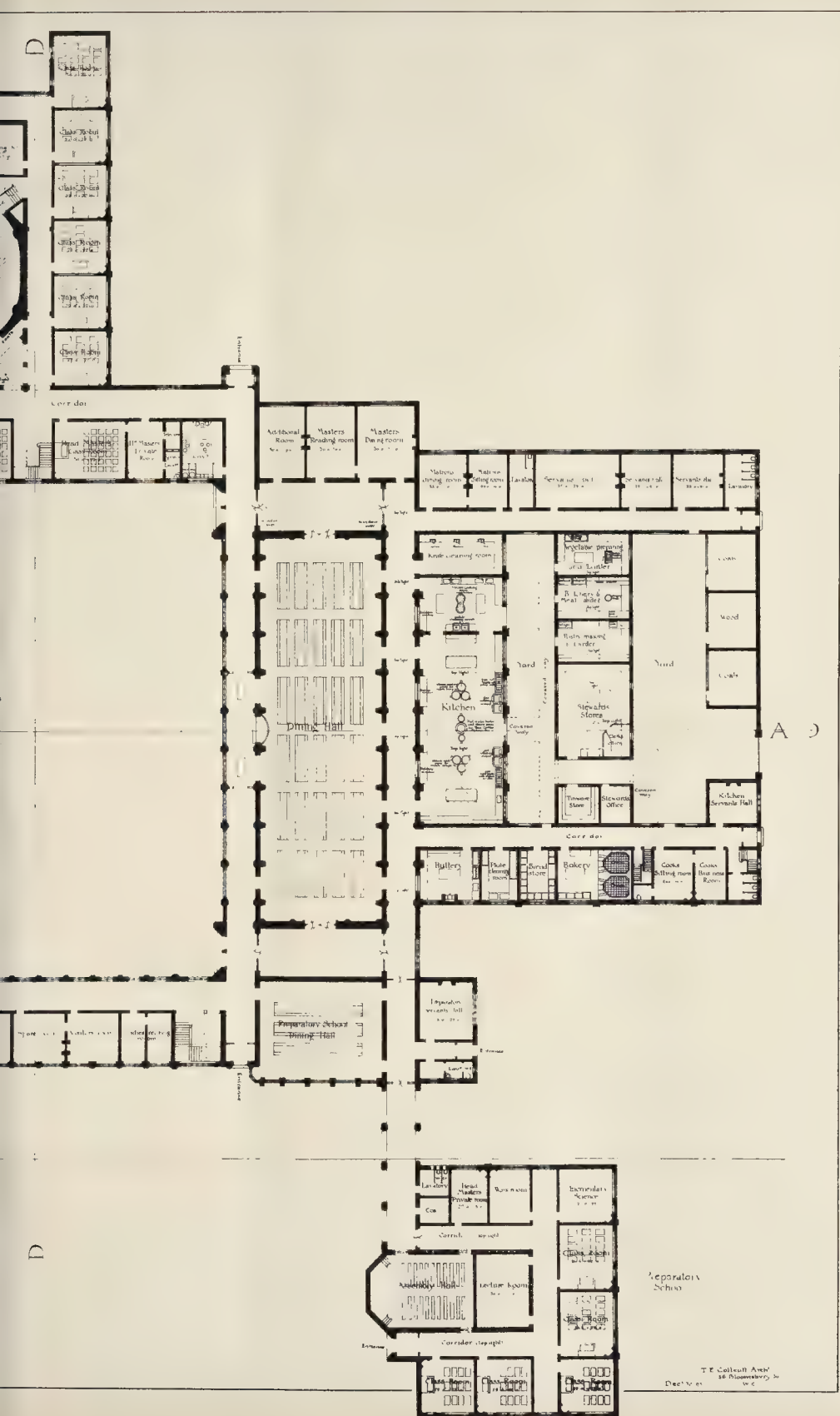


PHOTO LITHO SPRAGUE & CO. 4 & 5 EAST HARDING STREET FETTER LANE E.C.





SCHOOLS.—By MR T E COLCUTT, FRIBA  
BLOCK.









COMPETITION DESIGN FOR CHRIST'S HO

GENERAL V



1894.



PHOTO-LITHO SPRAGUE & CO. 485 EAST HAWK STREET FETTER, LANE E.C.

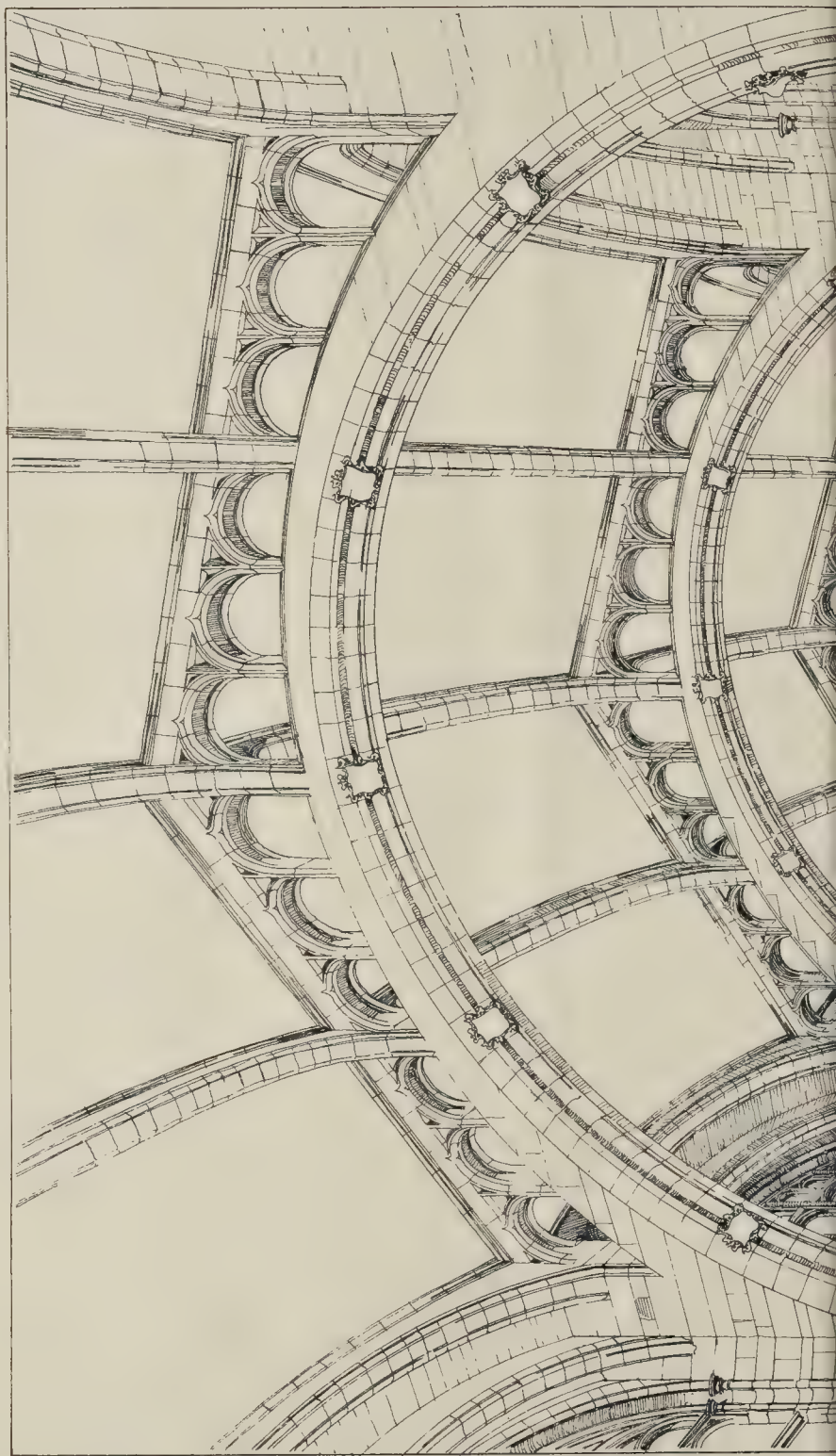
SCHOOLS—By MR T E COLLCUTT, F.R.I.B.A  
BUILDINGS.



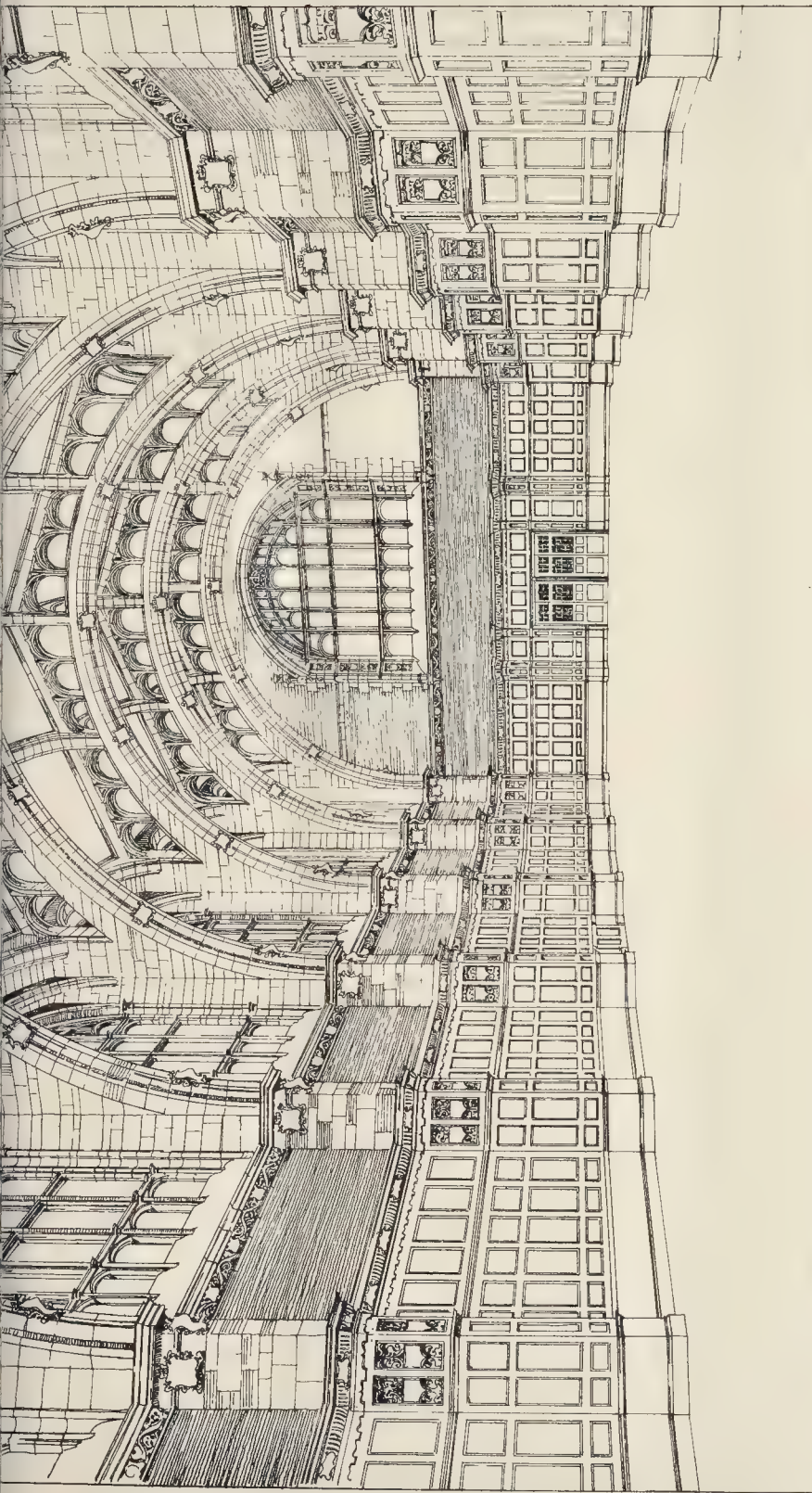




THE BUILDER, JULY 14, 1894.







COMPETITION DESIGN FOR CHRIST'S HOSPITAL SCHOOLS—BY MR T E COLLCUTT FRIBA  
INTERIOR OF DINING HALL.





disposed to find out the nearest exit, which would be into the house through any faulty pipe or fitting.

Thirdly, the reduction in the amount of ventilation in the drain would increase the danger of syphonage.

Fourthly, the present imperfect condition of sanitary law, science, and practice affords a house owner little protection against himself and still less against his insatiable neighbour. For instance, a certain local Sanitary Authority compels everyone to have a number of fresh air inlets to his drain, and, knowing the danger of such inlets becoming, under certain circumstances, outlets, he requires them to be fitted with talc doors. While these are in working order the plan may work well, but when the talc doors fall off, which they assuredly will do in time, the drain air will freely career into the nearest windows of its own and its neighbour's house. This would be bad enough in the present system, but how much worse would it be if the disconnector were removed?

The offer of sewer gas is a strange method of solving a sanitary problem and of promoting sanitary neighbourhood.

There does not appear to me any good reason why the disconnector should be removed in order to carry out a system of ventilating the sewers if it should be found necessary (and this is essentially a point for municipal engineers to decide), that each house should bear its share of sewer ventilation.

The ventilating pipe might be taken at the expense of the local Sanitary Authority from the sewer side of the house drain disconnector to a suitable height above the roof of the house, but no scheme of this sort would work satisfactorily without a more scientific system of inlet ventilation than at present prevails, and the outlet pipe should be con-

it was freed by the use of a mop stick as a plunger without bailing out the manhole.

When a flush can only amount to two or three gallons at the top end of a 50 ft. drain, the size of the pipes is of the utmost importance, even to 1 in.

I have designed very many drainage systems for dwelling-houses, having only 4 in. main line, and never found them unsatisfactory.

I do not see how Mr. Read would manufacture sewer gas in an interceptor trap unless he made it air-tight with no "air inlet" or outlet. Will Mr. Read maintain that the best forms of "interceptor" are well arranged as to flush, size, &c., are of no benefit as a protection against germ diseases in adjacent houses?

C. H. SUTTER.

#### "THE DEVASTATION OF NUBIA."

SIR,—May I be permitted to point out that the temple of Kom Ombo would only be submerged by making a reservoir at Gebel Silseleh. The reservoirs, either at Philæ or at Kalabsha, are to the south of Kom Ombo.

SOMERS CLARKE.

#### SCIENCE AND ART DEPARTMENT EXAMINATIONS.

SIR,—I think "One of Those Misled" presumes slightly when he says it is evident that only those at the May examinations who "scrambled through the eight questions" at the first stage were invited to compete in the final. If he reads his question paper carefully he will find he may not attempt more than eight questions, and anyone answering six, or even five, "fully and correctly" would stand an excellent chance of "scrambling through," as it is well understood that the only qualification required is to satisfy

for; in fact, they usually get on best who ignore the official document altogether and study those things which are not mentioned in it.

If the subjects I have enumerated are really intended to be included, due notice ought to be given or the directory revised.

Then, again, why cannot a Saturday from 2 to 10 p.m. be selected for the second edition of the examination? It is a far more convenient day for working-class students for whose education these examinations are held, and does not break into business hours. The arrangement now decided on also seems to offer a great inducement to country students to sit for the Examination in order to obtain a free trip to London.

In conclusion, allow me to observe that the advisability of holding earlier in the year the examinations in those subjects which require a second trial for students in honours is a point which might very well be considered by the Department.

ANOTHER STUDENT.

#### THE COST OF WORKING AN ELECTRIC ELEVATOR.

SIR,—Possibly the following figures derived from actual practice of the cost of operation of an electrically-driven passenger elevator may be of interest to your readers. The elevator in question was erected under my supervision for Mr. E. D. Stern, at 4, Carlton House-terrace, at the commencement of the present year, the contractors for the work being the Otis Elevator Company.

The elevator itself is fitted with a 600 lb. car, having a rise of 40 ft., and designed to work at the rate of 60 ft. per minute, and is fitted with all the latest improvements in regard to self-acting safety appliances.

It is operated from within by a simple regulating switch, which can be worked quite well by a woman or child; and everything has so far given great satisfaction.

The current is supplied from the mains of the Local Supply Company, whose invoice for the last quarter lies before me. The cost of current for working during the last three months amounts to the sum of 9s. 2d., during which time the lift has been in regular use, the number of trips being probably about 400, the cost of an average journey amounting to from one farthing to one-third of a penny, according to the load.

MORGAN I. M. WILLIAMS,  
M.A., Assoc. M. Inst. C.E.

#### FOUNTAIN FEVER HOSPITAL, TOOTING.

SIR,—As an announcement has appeared in your paper that Mr. Edwin T. Hall has been duly appointed architect for the "Park" Fever Hospital, Hither Green, it appears necessary to me to say that on the same occasion and similarly I was appointed architect for the above by the Metropolitan Asylums Board, and that the work is to be proceeded with at once.

A. HESSELL TILTMAN.  
\* \* The former announcement was not official; it only reached us informally through the architect, in the same way as this one. We should of course have given both announcements together had we received them. We feel obliged to add, however, that we hope Mr. Tiltman's plan is to be a good deal modified before it is carried into execution.

—ED.

#### HOLIDAY HOMES OF THE RAGGED SCHOOL UNION.

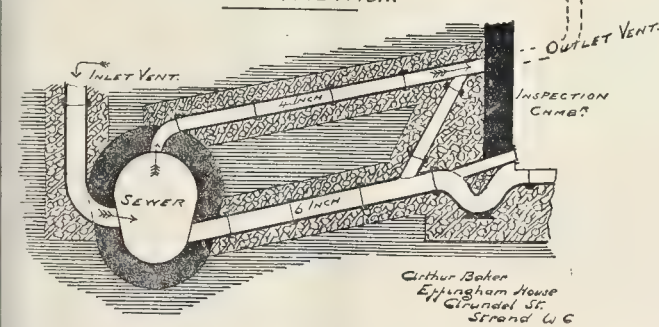
SIR,—The readers of the *Builder* are well able to judge of the additional suffering imposed by the hot weather on poor children who make up the families of three, four, five, and six, all too often to be met with living, each family, in one room. Brilliant weather that means enjoyment for comfortably housed and circumstanced people means an increase of sickness and death in the stifling room where we of the Ragged School Union find the bulk of our 50,000 poor little protégés. To enable them to better resist the heat we must make them strong by a fortnight's holiday in the country, where by means of fresh air, well-ventilated dwellings, and a regular and ample supply of wholesome food, they can acquire that increased measure of bodily vigour that will enable them to better contest those insidious diseases introduced by the heat into the homes of the semi-stuffed and the half-starved. I therefore appeal to the generosity of your readers, and hope they will respond with contributions, however slight, to our Holiday Homes' Fund.

Holiday Homes' Fund,  
Ragged School Union,  
37, Norfolk Street, Strand, W.C.

JOHN KIRK,  
Secretary.

NORTHAMPTON INSTITUTE, CLERKENWELL.—The foundation-stone of the Northampton Institute, Clerkenwell, was laid by Mr. Charles Dorman, chairman of the governing body, on Monday, the architect of the building is Mr. E. W. Mountford, and Mr. W. Wallis is the builder. The contract price is 53,947l. The constructional steel and ironwork is being supplied by Messrs. W. H. Lindsay, Neal, & Co., of Paddington. Illustrations of the building have appeared in the *Builder* for April 15, 1893, and June 30, 1894.

#### SEWER VENTILATION.



ected with the crown of the sewer. I enclose a sketch suggesting an arrangement of inlet and outlet pipes. The subject of the number and position of the inlet vents would also require very careful consideration in order to prevent their acting as outlets, and to ensure each outlet doing its fair share of the work.

ARTHUR BAKER, R.C.A.

SIR,—In your issue of 23rd June, under the above heading, I agree with Mr. Bernard Dicksee in what he states.

With regard to Mr. Van Putten's opinion on Interceptor traps, I fail to see any proof of their being small cesspools—i.e., in a well-designed system of house drainage. I do not see where the theory comes in, by placing an "interceptor trap" in a sewer drain to prevent sewer gases entering same. As to the low death-rate of Lewisham district possibly it might be still less if "interceptor traps" are introduced with proper judgment. Mr. Van Putten does not state the proportion of deaths likely to be caused by defective sanitary arrangements in that district, which is an important point.

Mr. Read's letter, published in the issue of June 1st, gives one to understand that he would have the sanitary authority take charge of house drains be what Mr. B. Dicksee truly remarks).

Mr. Read, it seems, cannot see how sewers can be dealt with satisfactorily without the aid of drain vents, but I fancy there are engineers equal to the task.

As to the unventilated portion of the cross drain—i.e., from sewer to interceptor—does not each flush from the house carry air with it and help to ventilate the usually short length of drain outside the house? And if a few bubbles of sewer air pass through the seal it would pass into the open air, as Mr. Read himself proposes, by the soil air-pipe clear of the roof, but I venture to say even this would seldom happen.

There are traps made without a 2 in. drop, which are useful sometimes in extremely flat gradients, so that only 1 in. or so is lost by the insertion of a trap, and if it is necessary there are many ways of coping up for the want of a 2 in. drop.

I have found in the case of a half-loaf of bread stuck in a 4 in. interceptor trap (lunatic asylum) that

the examiners that you have a sound knowledge of what you are writing about. No doubt your correspondent is disappointed at not passing, in which case I can sympathise with him, but he should not seek consolation by blaming those in authority for non-attendance to the rules. I should advise him to try again, when I hope he will meet with success.

"ONE WHO HAS PASSED."

SIR,—In reply to "One of Those Misled," I do not consider that the Honours Building Construction Examination of 1894 was more difficult than it has been of late years. Neither do I think it required more time to work. As far as I know, no one has ever been granted a First-class who has not correctly answered eight questions. (Of course I am speaking entirely of the first paper of the Exam.)

Your correspondent is quite right in saying the subject has a very wide range, and a great deal of labour is necessary to work the subject thoroughly up, but I certainly do not consider the Exam. of this year any more difficult in any way than it was in 1892, when I had the pleasure of sitting. Of late years the examiners have demanded a much more complete knowledge of graphics, statics, and calculations with regard to iron structures. I believe four out of every five who sit know very little of this branch of the subject, and depend mainly upon their knowledge of "Rivington, No. III." Hence their ultimate defeat.

FIRST HONOURS, 1892.

June 30, 1894.

SIR,—In addition to the points raised by your correspondent in your issue of the 30th ult., kindly allow me to mention that for many years past there has been a systematic evasion of the terms of the official syllabus which point out the course of study required.

The Examination is ostensibly intended to be on the higher principles of construction as applicable to buildings, yet every year questions are set on one or more of such separate and comprehensive subjects as architecture, sanitation, hot water supply, ventilation, and the various patented articles in the market which are used in connexion with buildings. So that a student scarcely knows what to prepare



## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—II.

VARIOUS METHODS OF SUPPLY. ADVANTAGES AND DISADVANTAGES OF EACH.

**T**HE selection of a source from which to obtain a water supply for a rural district is dependent on a variety of considerations, amongst which are the following:

- 1.—Purity of the supply.
  - 2.—Volume and permanency.
  - 3.—Elevation with regard to the district to be supplied.
  - 4.—Distance from the district to be supplied.
  - 5.—Nature of intervening ground.
  - 6.—Purchase of water rights and easements.
- In the "Suggestions as to Water Supply, &c.," issued by the Local Government Board, the various sources from which water is usually obtained for purposes of domestic supply are arranged as follows:—

From mountain ranges, which act as condensers.

From rivers and streams.

From natural springs.

From wells artificially formed.

From impounding reservoirs.

From a combination of two or more of these sources.

Impurities likely to be met with in a source of water supply are of two kinds:—

- 1.—Those that can be removed by inexpensive mechanical means—*e.g.*, filtration.
- 2.—Those which cannot be thus removed, or in the removal of which heavy expense would be incurred.

In the former class are included organic matter of vegetable origin in suspension—*e.g.*, peat, also non-poisonous mineral substances, such as carbonate of lime.

In the latter class are included the products of decaying organic matter of animal origin, as well as actual organic life, or what is generally known as sewage contamination; also poisonous substances, such as lead, and other substances, such as common salt (NaCl) which become injurious when present in large quantities.

Undoubtedly the first necessity of a water supply for domestic purposes is purity, and this must be assured at the outset.

In taking samples of water for purposes of analysis a perfectly clean stoppered Winchester quart bottle, holding about half a gallon, should be used. The bottle should have been previously washed out with a little strong sulphuric ( $H_2SO_4$ ), or hydrochloric (HCl) acid, and then rinsed with frequent changes of pure water until the rinsings do not redden a piece of blue litmus paper. Before taking the sample, the bottle and the stopper should be thoroughly rinsed with the water to be analysed, and should then be filled to the neck with the water, stoppered, sealed, and labelled on the spot, and, if possible analysed, within forty-eight hours.

In submitting a sample of water for analysis, as much information as possible should be given as to the situation of the source from which it has been taken, both geologically and with regard to any possible causes of pollution in the vicinity. It is only by reading the analysis of a sample of water in close conjunction with the most careful observation of the surroundings and conditions of the source from which it has been taken, that any reliable opinion can be formed as to the suitability or otherwise of the supply for domestic purposes.

The River Pollution Commissioners, in their sixth report, classified the various sources with regard to potability as follows:—

Wholesome	1.—Spring water	Very palatable
	2.—Deep-well water	
	3.—Upland surface water	
Suspicious	4.—Stored rain water	Moderately palatable
	5.—Surface water from cultivated land	
Dangerous	6.—River water from which sewage gains access	Palatable
	7.—Shallow well-water	

Rainfall is, practically speaking, the ultimate source of all water supply, and the nearer the source the purer, though not necessarily the more palatable, the water. Rainfall is disposed of in three ways:—

*First.*—A portion is again evaporated.

*Second.*—Another portion flows over the surface of the ground to form streams and rivers.

*Third.*—The remainder sinks into the ground, and forms the underground reservoirs in which

wells are sunk, issuing again at the lowest lip as springs.

#### 1.—SPRING WATER.

The water from deep-seated springs is usually organically pure, though frequently highly charged with mineral substances. Where, however, the outcrop of the water-bearing stratum, at the point where it yields the spring, is of large area, and upon it houses, farmyards, and other possible sources of pollution are in existence, great care should be taken that the spring is not thereby affected.

A spring rises on the side of a hill at the junction of the upper green sand with the Oxford clay. A farmhouse is situated about 150 yds. distant from the spring, and 100 ft. above it, on the outcrop of the upper green sand. A sample of water from the spring was submitted to the County Analyst for examination, and the following is an extract from his report thereon:—

"This water is plainly contaminated with the products of decomposition of animal matter, and is liable, as has been the case in several recorded instances, to carry the infective matter of specific disease. A consideration of the facts of the case confirms me in this opinion, and the amount of pollution is greater than at first sight appears, because the green sand furnishes a water of more than average purity: probably about one-half the solid matter of this water is directly derived from the farm sewage."

The intervening land between the farmyard and the spring is grass pasture, and there is no other discoverable source of pollution.

#### 2.—DEEP-WELL WATER.

Deep wells, especially those sunk through an impervious bed of considerable area, afford supplies of excellent quality. Care must be taken that the portion of the well above the impervious bed is so constructed as to prevent percolation from the surface or from the upper strata.

#### 3.—UPLAND SURFACE WATER.

Water from this source is usually satisfactory, but is frequently discoloured with peat, even to such an extent as to render it unfit for domestic purposes.

#### 4.—STORED RAIN-WATER.

Where there is no other available source, and there is freedom from smoke, &c., rain-water may be used for domestic purposes, but it is unpalatable on account of the absence of aeration. It should be filtered before storage, and the tank should be well ventilated.

The three remaining sources are not fitted for domestic purposes. River water is, however, frequently used, but it requires efficient filtration, which renders it too expensive for use on a small scale.

The next points for consideration are the volume and permanency of the source. To obtain this information frequent gaugings, taken over a considerable period, are necessary. The area of the watershed relied upon, the greatest and least rainfall, percolation, and evaporation are all important factors of the result. These points will be considered in a further paper. Information from the oldest inhabitants of the locality must not be allowed too much weight, or serious consequences may result.

In a recent survey for a village water supply, three apparently deep-seated springs of most excellent quality were found in close proximity to each other. These springs were gauged on the 21st March, 1893, and yielded a total volume of 820 gallons per minute, and on May 6 they had fallen to 436 gallons per minute. In June they were dry.

In the course of the same survey a spring was brought under notice, as to the permanency of which opinions were somewhat conflicting. Reference was made to the "oldest inhabitants," three nonagenarian labourers, who stated that they had known the spring all their lives, and that it had never yielded less than a certain flow. This was in February, 1893, and shortly after the spring failed.

The elevation of the source with regard to the district to be supplied is of great importance, for upon this will depend whether the natural flow of the water by gravitation can be utilised, or whether pumping must be brought into requisition. Especially for a rural supply, gravitation should be secured if possible; for although the outlay is generally much greater, a heavy annual cost is avoided. Occasionally, where a sufficient quantity and fall of water are available, water-wheels, turbines, and hydraulic rams, which require no fuel and little attention, may be used; and, in exposed situations, windmills are sometimes employed for pumping water on a small scale.

In deciding upon the relative merits of a gravitation and a pumping scheme, the distance of the source from the district to be supplied forms an important element, for if the distance over which the water has to be carried, in the former case, is great and the fall slight, pipes of large diameter may be required, entailing considerable expense, while in the latter case the length of pipe may be inconsiderable.

Especially in a gravitation scheme, on account of the relatively great distance over which the supply has usually to be carried, the question of easements is of great importance; whilst the question of water rights affects both gravitation and pumping schemes to much the same extent. These claims frequently lead to so great an expense as to necessitate the total abandonment of a water supply scheme.

Every detail affecting these points should be carefully ascertained before any scheme is fully considered, and agreements in writing should be entered into with all parties in any way interested before works are commenced.

In a recent water supply scheme a claim was overlooked which might easily have been settled for £5. In consequence of this omission a trial took place four years later, costing the authority who carried out the scheme over £600.

### GENERAL BUILDING NEWS.

**PHYSICAL LABORATORY, SOUTH AFRICAN COLLEGE.**—According to the *Cape Weekly Times*, the work of erecting a new physical laboratory at the South African College is being proceeded with. The new building will contain a general laboratory, 51 ft. by 46 ft., a lecture room, 36 ft. by 27 ft., a workshop, a room for electrical experiments, a professor's and an instrument room. The laboratory and lecture-room are carried up the full height of the building, but large attics for storage are provided over the other parts of the structure. Inside no ornament is attempted, but the contract includes fitting of every kind necessary for the working of the laboratory, brick tables built independently from the floors to prevent vibration during delicate experiments, sliding blackboards, draught cupboards, a forge, carpenter's benches, tank table benches, and cupboards and drawers for instruments. The instructions given to the architects were to design as large and substantial a building as possible, and consequently no expense has been lavished on the interior, but a simple treatment has been adopted of red brick, with stone dressings sparingly used to emphasise the more important features of the building. The design also contains a covered stoep, with stone columns to protect the entrance from sun and rain, and a small turret surmounting the roof. The architect is Mr. Herbert Baker, A.R.I.B.A., and the contractor is Mr. Maxwell.

**RESTORATION OF CONGREGATIONAL CHURCH, BURTON-ON-TRENT.**—Burton-on-Trent Congregational Church is to be newly seated, and to undergo restoration and decoration, from the plans and designs and under the superintendence of Mr. R. E. Carpenter, architect, of Burton.

**ENLARGEMENT OF HOLY TRINITY SCHOOLS, BURTON-ON-TRENT.**—These schools, situate in Hawkins-lane, are being enlarged from the plans and under the supervision of Mr. R. E. Carpenter, architect, Burton, as approved by the Education Department. The builder is Mr. J. Varlow, of Burton.

**RESTORATION WORKS, BRISTOL CATHEDRAL.**—On the 4th inst., the Dean of Bristol fixed the capstone of the central tower of Bristol Cathedral. When the work was undertaken, under the superintendence of Mr. Pearson, it was found that the tower was in an extremely dilapidated condition, particularly the south-west and west portions that were most exposed to the weather. The whole of the external face of the tower has been restored, stone for stone: every stone or moulding which was so weather-worn as to have lost its original face, or that showed signs of active decay, has been cut out and renewed exactly upon the old lines. It was found necessary to entirely renew the weatherings to the external face. In the upper stage, the original mullions were found to be of very weak construction. These have been taken out and replaced by others of greater depth. New battlements, parapet, pinnacles, and angle-turret have been built, and some of the original stonework has been embodied in them. The design of the tower is exactly the same as of the former ones taken down. A new roof has been put on.

**METHODIST SCHOOL, FARNWORTH, LANCA-SHIRE.**—The memorial stones in connexion with a new Primitive Methodist school in Queen-st., Farnworth, were laid a few days ago. The dimensions of the building are 57 ft. by 52 ft. The entrance to the school is a vestibule, and from this leads one of the staircases into galleries and class-rooms above, 30 ft. by 40 ft. The infants' room is 30 ft. by 14 ft. The minister's vestry is enlarged, and provided with lavatory and vestibule, and a staircase leads direct from the vestry on to the platform. A kitchen is



provided in a corner of the school-room. The galleries and upper class-rooms are reached by two staircases, seven class-rooms being provided on the first floor, and likewise a choir vestry. The gallery is carried round three sides of the school, the class-rooms being divided therefrom by boarded partitions, stained and varnished. The heating is on the low-pressure hot-water system, and the buildings are ventilated by wall inlets and roof extractors. The contract has been let to Messrs. Coope Bros., of Farnworth, and the work is being carried out under the supervision of Mr. T. Greenhalgh, architect and surveyor, Bolton.

**MISSION HALL, PECKHAM.**—The foundation-stone of a new mission hall, situated in Meeting House-lane, Peckham, was laid recently. The building will accommodate over 250 persons, with two class-rooms, kitchen arrangements, &c. Mr. R. P. Whellock, of Nunhead, was the architect, and Mr. G. Simmonds the builder.

**HOTEL, CARDIFF.**—On the 6th inst. the opening took place of the Avondale Hotel, Cardiff. The hotel was built and fitted up by Messrs. W. Thomas & Co. of the West Bute Dock (under the superintendence of Mr. S. C. Hobbs), from plans prepared by Mr. E. W. M. Corbett.

**RESTORATION OF AN OLD CITY CHURCH.**—According to the *City Press* the interior of the Church of St. Stephen, Coleman-street, has just been restored. The old galleries have been taken down and replaced, and the upper gallery at the west end has been refaced. With regard to the seating accommodation, whereas there were formerly only two side aisles, space has been economised, and there are now two side aisles and a central aisle of considerable width. The old pews have been removed, with the exception of the new ones set in cathedral and tinted glass. The old wooden block flooring has given way to a solid wooden block floor, which covers a concrete foundation of several inches. Hot-water pipes for heating purposes have been introduced, and a new screen has been erected at the west end, and will be filled in with glass. The old pulpit, which formerly stood on a high pedestal in the centre of the church, has been removed to the northern side, and lowered. It may be said that the west end of the church has been practically rebuilt, and all the ancient and valuable carving has been preserved and reused. New altar steps have been put up in place of the old ones, while the Communion space has been enlarged. The church has also been lighted throughout by electricity by Messrs. J. F. Clarke, of Moorgate-street, five brackets having been provided for each side of the interior. The whole of the work has been executed by Messrs. Dove Bros., under the superintendence of Mr. J. Ebenezer Saunders, F.S.A. The work of redecoration and the glass work have been done by Messrs. A. L. Moore & Co.

**CRIPPLEGATE INSTITUTE.**—The memorial-stone of this building, situated in Golden-lane, E.C., was laid on the 12th inst. by the Duke of York. The building is being erected from designs by Mr. Sidney R. J. Smith, and will contain a library, concert hall, and technical class-rooms.

**CHURCH, GOATLAND, WHITBY.**—On the 6th inst. the foundation-stone was laid of a new church at Goatland, Whitby. The cost of the new building will be about 2,000l. The architects are Messrs. Demaine & Brierley, of York; and the contractor is Mr. Barnes, of Malton. The building will be of stone, and the style of architecture adopted is Late Gothic.

**THEATRE, WOLVERHAMPTON.**—The commemoration-stone of a new theatre, which is being erected in Lichfield-street, Wolverhampton, was laid recently. The new theatre stands with a frontage towards Lichfield-street of 123 ft., with a depth from Lichfield-street to Berry-street of 122 ft., the length of the site in Berry-street itself being 114 ft. The building is practically isolated, being in main streets front and back, and having an 8 ft. passage between either side between that and the adjoining buildings. The theatre will be divided into five classes of audience, all classes of the audience being kept apart. On either side the grand entrance of the theatre in Lichfield-street are two shops, with basements underneath. On the ground floor will be the pit and pit stalls; the dress-circle will be on the first tier of the amphitheatre and the gallery on the second floor. The dress-circle tier itself has six rows of seats, accommodating 250 persons. The amphitheatre will hold 150 people, and the gallery of the theatre will hold 700 people. The builder is Mr. H. Gough, and the theatre is being erected from the design and under the superintendence of Messrs. C. T. Phipps & Son, architects, of London.

**CHURCH OF ST. WERBURGH, DERBY.**—The church of St. Werburgh, Derby, was consecrated recently by the Bishop of Southwell. The architect of the building was Sir Arthur Blomfield, but during the earlier stages of the work it was carried out under the direction of Mr. Percy Currey, architect, of Derby. The building is principally of Coxbench stone with the exception of the tracery and moulding work, which is of Hollington stone. The roof is of blue slates. The total length is 137 ft. 3 in., and the width (inside dimension)

62 ft. 2 in. The height to the ridge is something over 60 ft. The chancel is 40 ft. 6 in. by 27 ft., the organ-chamber 19 ft. 6 in. by 19 ft., the chancel aisle 19 ft. by 12 ft. 6 in., the nave 88 ft. 8 in. by 28 ft. 10 in., the aisles being the same length by 14 ft. The main entrances are at the north end and in the west aisles, and there is a small exit, with a door opening outwards, from the chancel aisle. The chancel is roofed with the pitch-pine, with open timber and hammer beams, whilst the internal roofing of the nave is of pitch-pine, unstained and unvarnished. Within the sanctuary, which is enclosed with an oak rail with wrought-iron standards, is a floor of glass mosaic. The sanctuary steps are of polyphant-stone. The carved interior of the west end was by Messrs. Eady & Hobbs, who were also the sculptors in connexion with the work. At the gable end of the new church over the main entrance there is a niche containing a figure of St. Werburgh, sculptured by Mr. Bridgeman, of Lichfield. The organ has been renovated and refixed by Messrs. Lloyd, of Nottingham, in the south-west transept. The old lectern used in the old church is again brought into use, and the nave is filled up with the old seats. The church will accommodate 800 worshippers, the sides being filled with chairs. The old chancel was being filled with chairs, and the vestry will be screened off by means of a curtain. The ventilation of the church is effected by means of Honeyman's Trunk Ventilator; whilst the building is heated by Haden's combined system of hot air. The whole of the floors of the church, with the exception of the chancel and two porches, are of pitch-pine blocks. At present the church is only temporarily lighted by gas. The window in the new chancel was practically designed and made by Mr. C. E. Kempe, of London. The subject is "The Witness to the Atonement." There are seven lights, divided into three groups, the central group being composed of three lights, and those on each side of two. The window in the south aisle, consisting of three lights, is also by Mr. Kempe. The window at the west end of the north aisle is by Messrs. Ward & Hughes. All the windows, with the exception of those mentioned, are glazed with white sand cathedral-glass in lead lights. The pulpit is of wrought-iron, semi-circular in shape, and supported by seven iron pillars upon a stone base. The steps, which are of oak, are provided with a reeded oak rail. The floor is of oak. The work was executed by Mr. E. H. Haslam, of St. Helen's Engineering Works, Derby. The wood-work was done by Messrs. Walker & Slater, and the stone base was supplied by Mr. Tinkler. The works manager in connexion with the erection of the church has been Mr. A. L. Tofts, and the architect has been represented by Mr. G. Horton. The contractors were Messrs. Shillitoe.

#### SANITARY AND ENGINEERING NEWS.

**SEWERAGE SCHEME, YORK.**—In view of the approaching completion of the York sewerage scheme, the members of the City Council, on the invitation of the Chairman and members of the Sewerage Committee, recently inspected the pumping-station at Fulford, and afterwards the disposal works at Naburn. The pumping-station is the point at which, when the scheme is completed, the whole of the sewage will be delivered by an egg-shaped sewer, 6 ft. 9 in. by 4 ft. 6 in. In addition to the construction of new sewers, works have been carried out in various parts of the city for the removal and interception of old drains. All the sewage from the city, after gravitating by means of the new sewers constructed under contract No. 2, will be pumped up and delivered to the precipitation tanks at Naburn through a cast-iron rising main. On reaching Naburn the rising main will discharge the sewage into a long culvert or open channel into which chemicals will be delivered through another channel. After being thus chemically treated the sewage will pass into the precipitation tanks, from which the effluent water will either be delivered direct into the river or filtered over the land belonging to the Corporation. The sludge or solids, which is precipitated in the tanks as the effluent water is gradually drawn off, will be passed through sewage presses and formed into cake manure. Practically the whole of the work comprised under the head of No. 2 contract is completed, together with the most important portions of the contracts 3, 3A, and 4. The rising main from the Fulford pumping-station to the Naburn precipitation works is finished, and the works at both these places are in an advanced stage. Mr. James Mansergh, M.Inst.C.E., has acted as consulting engineer to the scheme, and the work has been carried out under the personal supervision of Mr. James McKie, A.M.Inst.C.E., as resident engineer.

**WATER SUPPLY, COLEFORD, SOMERSET.**—The Frome (Somerset) Rural Sanitary Authority have appointed Mr. E. J. Yilcock, C.E., of Birmingham, Consulting Engineer to carry out the scheme for water supply for the district of Coleford, which has been prepared by their Surveyor, Mr. W. T. Purnell.

**SEWERAGE WORKS, BRIDGEND, GLAMORGAN.**—

Major-General C. Phipps Carey, R.E., held an inquiry at the Town Hall, Bridgend, Glamorgan-shire, on the 27th ult., into an application made to the Local Government Board by the Urban Authority of the Bridgend Local Board and the Rural Authority of the Bridgend and Cowbridge Union to borrow 9,000l. and 7,000l. respectively for works of sewerage. The main outfall from the town of Bridgend to the sands, the site selected for treatment of the sewer, is about 2½ miles in length, the cost of which will be borne by the above-named Authorities in proportions already agreed upon. The towns of Tondy and Aberkenfig, and the districts adjoining them, will be efficiently drained. Mr. George Fenton Lambert and Mr. J. C. Rees, the engineers of the scheme, went into the technical details of the scheme, and explained the plans which they had prepared. It is estimated to meet the requirements of about 10,000 people. The Inspector afterwards inspected the site of the proposed outfall and line of sewer, also the district above Bridgend, viz., Tondy and Aberkenfig. There was no opposition to the scheme.

**WATER SUPPLY, BIRMINGHAM.**—An excursion to the Elan Valley in mid-Wales was made on Tuesday by the members and officials of the Birmingham Corporation and others to inspect the works which are in progress near the junction of the rivers Elan and Claerwen, for supplementing the existing water supply of Birmingham by tapping the upper watershed of the mountains of Cardiganshire and Radnorshire. The scheme in question (we quote from the *Times*) originated some four years ago in a report of the Water Committee of the Birmingham City Council, calling attention to the inadequacy of the actual water supply for the rapidly-growing needs of the city, and urging that arrangements should be made for opening up fresh sources of supply in Wales in accordance with the recommendations of Mr. Gray, the waterworks engineer, and Mr. James Mansergh, of London, who has been called into consultation for this purpose. The first portion of the undertaking, which is calculated to bring twenty-seven million gallons of water to Birmingham daily, is estimated to cost 3,621,950l. but the estimate for the entire scheme is about 6,600,000l. The lower extremity of the waterworks is at Caban Coch, upon the Elan, some three miles from Rhayader. Mr. James Mansergh gave a brief description of the works, and conducted the party round the principal points of interest. At the summit of a steep tramway, leading to a stone quarry, where the valley narrows considerably, the lowest and most important of the series of dams is being constructed. It will be 120 ft. high in the centre, will measure 600 ft. from bank to bank, and its thickness at the base will be the same as its height. The foundations are laid in a trench cut in the solid rock of the river bed, over which the water pours down in times of flood in enormous quantities.

The scheme of the Birmingham Corporation is to impound a large part of this flood-water, and to use it, partly for the supply of Birmingham, and partly in a regular flow of compensation water to the river, as required by the Act of Parliament, in the interest of the riparian owners along the Wye. The effect of erecting the Caban Coch dam will be to turn some four to five miles of valley into a deep serpentine lake, having a top-water area of 479 acres and a capacity of 7,540 million gallons. The dam will present to this vast body of water, and almost upright face, but the outer, or lower, side will be curvilinear slope. In times of flood the water will pass over the top of the dam to a depth of about 3 ft. Rather less than half a mile from Caban Coch is the confluence of the Elan and Claerwen, where the valley bifurcates with the two rivers, the reservoir extending about a mile up the one and some two miles up the other. Crossing the stream, the route of the party was up the Elan to the site of a submerged dam, to be built across the reservoir 40 ft. below the level of the top water. The purpose of this erection is to stop back some 500 million gallons of water contained in a portion of the reservoir above, which is reserved for the use of Birmingham consumers. Just behind this submerged dam commences the culvert to Birmingham, in the form of a tunnel carried for a mile and a quarter through the mountain Y Foel. This tunnel will measure about 8 ft. 6 in. by 8 ft. 6 in., and will convey, if required, 75 millions of water a day. The water will be carried by tunnels, culverts, and pipes to Frankley, near King's Norton, where it will be filtered, and pass by gravitation to the Monument reservoir, Edgbaston. The submerged dam will carry a viaduct, by which a new road will cross the reservoir in lieu of the bridge hitherto used near Cwm Elan. Higher up the Elan Valley will be the Pen-y-gareg dam, forming the lower end of a lake having an area of 424 acres and a storage capacity of 1,320 million gallons, and the Craig-y-Allt-Goch, with an area of 217 acres and a capacity of 2,000 million gallons. This chain of three reservoirs, the lower one with its inner reservoir already described, will provide in the driest season for 27 million gallons of water a day to Birmingham, and a like quantity of compensation water. If more water is wanted, additional pipes will have to be laid for its conveyance, and the extra water will have to be taken from the Claerwen by the construction of a series of three reservoirs upon that stream, having an aggregate area of 661 acres and a capacity of 6,500 million gallons.



## FOREIGN AND COLONIAL.

FRANCE.—It appears that the maintenance of the Eiffel Tower in the 1900 Exhibition is not to be obligatory on competitors. At the request of a certain number of members of the committee the competitors are to be left free to modify or suppress the Eiffel Tower in their designs, if they prefer to do so. In case of suppression, the State will have a pretty large indemnity to pay to the Eiffel Tower Company, but the artistic character of the 1900 Exhibition will gain greatly by it.—The Department of Public Works is studying a new method of verifying the elasticity of bridges by the aid of photography. The photographs will give the exact depression and oscillation of the bridges under various loads.—The Minister of Fine Arts has commissioned M. Roty to design a medal in commemoration of the funeral of M. Carnot.—M. Paul Dubois, the sculptor, and Director of the Ecole des Beaux-Arts, is to execute the portrait of the new President, who is a personal friend of his, for the next Salon.—The bronze statue of Condorcet, by M. Jacques Perrin, has been placed on its pedestal on the Quai Conti, and is to be inaugurated on the 14th.—M. St. Marceaux, the sculptor, is to execute the monument to M. Tirard, former president of the Council, who died last year. The model which has just been completed, represents "Devoir" seated before the tomb of Tirard, whose medallion portrait is sculptured on the top stone of the monument.—The "Compagnie des Mines" of Lens has erected at Haumont a church of a novel construction, entirely in steel, composed of caissons so constructed as to leave a stratum of air of 15 to 20 centimètres between the inner and outer walls. They are cross-braced internally with ties, and the air can, if desired, be put in circulation between the two skins. The main object is to produce a building in which internal variation of temperature can be prevented. The interior fabric is lined with wool.—The Municipal Council of Lyons has voted the erection of a monumental statue to President Carnot.—It is announced that a number of valuable paintings have been stolen from the Longchamps palace at Versailles. The Borelli Museum in the same town was robbed in a similar manner some little time since.—A Historic and Archaeological Society has been founded in the neighbourhood of Corbeil and Etampes, the main object of which is to prevent destruction of ancient objects of interest.—The eminent sculptor and ceramic artist, Joseph Carries, who was an important adherent of the Champ de Mars Salon, has died at the age of thirty-eight. The first exhibition in which he attracted attention was that of 1878; later, in 1887, he exhibited various busts marked by great power of style and expression, (almost all produced by the *cire perdue* process. He received Legion of Honour decoration in 1892. He was a native of Lyons.

## MISCELLANEOUS.

SANITARY INSPECTOR.—At an examination for Inspectors of Nuisances, held at Norwich on the 6th and 7th inst., eighteen candidates presented themselves. Questions were set to be answered in writing on the 6th, and the candidates were examined *visu voce* on the 7th. The following eight candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspector of Nuisances:—A. Garner, Bloxwich; G. Gavin, 95, Asylum-road, Peckham; W. E. Gleave, Everton, Liverpool; Ellen Louisa Hart, 44, Ampt-hill-square, N.W.; A. Kent, Skelton, Stoke-on-Trent; R. Miller, Dundee; F. Motum, Gundsburgh, Woodbridge; J. J. Newman, 73, Manor-road, Brockley, S.E.

STABLES FOR THE EMPRESS FREDERICK OF GERMANY.—At her new Palace at Cronberg (Taunus), the Empress Frederick of Germany has had a range of stables built from the plans of Herr Ihne, the well-known architect, of Berlin. The palace is situated close to the town of Cronberg on the Taunus Hills. The stables are at the rear of the castle, planned in the form of a quadrangle, one side of which is occupied by coach-houses. In the principal stable there is one range of twenty stalls of extra size and strength for large carriage horses. By the Empress's commands the stables fitted by Messrs. Musgrave & Co. for the Prince of Wales at Sandringham were taken as a model, and everything was done under the Empress's personal supervision. The divisions between stalls have wrought-iron open-work panels, the head end of which between the mangers is made solid, to prevent the horses seeing through at feeding time. Each stall division has Musgrave's patent sliding barrier to draw across the gangway at night, so that each horse is effectually confined in his own stall in case of breaking loose. Each pillar terminates in a polished brass ball, with brass neck mouldings, rings, chains, &c. The lower part of each division is filled with teak, raised well off the floor by a ventilating sill, which runs off water freely in washing, and allows air to play between the wood paneling and the floor. The mangers are enamelled inside, and completely encased underneath by a well-rounded sheathing of steel plate—all formed so as to prevent crib-biting and to be absolutely harmless to the most vicious horse. The halter straps work

noiselessly through vitrified bushings with the least possible friction or wear. The loose boxes are on another side of the yard, and are made to correspond with the stalls. Boxes for sick horses and some smaller stalls for ponies have also been provided. All the walls have panels of vitrified glass tiles of a pale green colour above the level of the mangers, impervious to moisture and with an indestructible surface. Electric light is fixed throughout the buildings. The drainage is by gutters and traps to which a flushing arrangement is connected from high pressure water mains. In central positions arrangements have been provided for quick and easy removal of soiled litter, &c., and for supply of fodder, &c., from hay-lofts and bins. The whole of the work has been carried out by Messrs. Musgrave, with their patent fittings and latest improvements of every kind.

CHURCH SANITARY ASSOCIATION.—Last Sunday was observed in many parishes as "Sanitation Sunday," when mention was made from the pulpit of the aims of the Church Sanitary Association. The annual sermon was preached in St. Paul's Cathedral by the Archdeacon of London, Dr. Sinclair, who said that to the majority of the dwellers in country districts the advantages of satisfactory drainage, dry soil, wholesome food, fresh air, cleanliness, warm and purified clothing, the laws of illness, the principles of infection and contagion, the requisites of convalescence, and the importance of the first symptoms of disease were probably unknown. This want of knowledge had called into existence the Church Sanitary Association which aimed at inducing the clergy in every parish to inculcate the laws of health.—The Rev. R. B. Machel, Canon of York Minster, preaching at St. Martin's Church, York, said that while ministers of religion had a special work in preaching the higher life of the spirit, yet that that preaching was incomplete if it was not brought into the range of practical everyday life and did not supply high motives for doing common everyday work in the best way for both soul and body.—The Rev. Arthur Robins, preaching at Holy Trinity Church, Windsor, said that the surroundings and associations of the dwellings were potent influences for good or evil in the life, and here it was that the moral miasma of insanitary areas settled like an ague upon tens of thousands of the souls of our poor. When the conditions were such that all physical and sanitary provisions for health and decency were in abeyance, then every moral law was and would be suspended.—The idea of the Church Sanitary Association is an excellent one, and it is to be hoped that it will have important results in strengthening the hands of those who are endeavouring to improve the sanitary condition of the poor. As is well known, one of the great difficulties is to get the poor themselves to take any interest in the efforts made to better their own condition in this respect; and the clergy may have much influence in persuading them of the great importance of sanitary conditions of living.

SCHOOL BOARD FOR LONDON.—The annual exhibition of work executed by the scholars and pupil-teachers in the London Board Schools will be held at the "Hugh Myddelton" Schools, St. James's-walk, Clerkenwell (near the Farringdon-road station), on Friday, Saturday, Monday, Tuesday, and Wednesday, July 20th, 21st, 23rd, 24th, and 25th. The exhibits will include various branches of drawing, shading, designing, cutting, modelling, casts, and models, and modelling in clay, designing in coloured paper, etc. The exhibition will be publicly opened by Mr. T. Armstrong, Director of Art at the Science and Art Department, at noon on Friday, July 20th, and will remain open from 12 o'clock till 9.30 each day. Admission free.

## LEGAL.

## A BUILDING DISPUTE AT TORQUAY.

In the Chancery Division on Wednesday, Thursday, and Friday, the 4th, 5th, and 6th insts., Mr. Justice North had before him the case of Oliver v. Hosking, which was an action brought by Mr. Thomas Oliver, the owner of the Royal Hotel, Torquay, for an injunction to restrain the defendant, Mr. John Hosking, a restaurant keeper and baker, from interfering with building operations in connexion with the hotel.

Mr. Samuel Hall, Q.C., and Mr. Ryland appeared as counsel for the plaintiff, and Mr. Bramwell Davis for the defendant.

Mr. Hall, in opening the plaintiff's case, said that the parties were neighbours, and that the plaintiff had built over a passage which was formerly arched over, but the archway had been pulled down by the plaintiff during the course of the alterations and a steel girder put in its place. The defendant's allegation was that the plaintiff had no business to change the burden of the support. The learned counsel said that the alteration did not increase but diminished the burden, as the weight of the new building was less than half that of the old one, and the support was obtained from the identical spot where it was obtained in the old building.

Mr. Justice North: Is your building higher than it was before?

Mr. Hall: No, my Lord.

The learned Counsel, continuing, said the

defendant took a crowbar and demolished and knocked down a portion of the structure and, added counsel, "he was proceeding to argue with us on this crowbar." An arrangement was afterwards arrived at by consent, whereby the defendant agreed to leave the question in issue to the Court. The buildings in question were situated upon Sir Lawrence Palk's estate, and the plaintiff asked for an injunction to restrain the defendant from interfering with the alterations. The defendant counter-claimed, and asked for a declaration that the wall on the west side of his premises formed part of his premises, and he also asked for an injunction to restrain the plaintiff from erecting any stud work facing Forwood-street.

The plaintiff, in his examination-in-chief, said that he was a cabinet maker and auctioneer. He made purchases at the Royal Hotel in January, 1893, and shortly afterwards gave instructions for the alterations in question to be made. He was called by one of the workmen one day to the scene of the alterations, and saw the defendant with a crowbar in his hand threatening to knock down anything which the workmen put up against the wall. He (the defendant) had knocked down a portion of the studwork before witness arrived. Witness asked defendant to settle the matter with his (witness's) solicitor, but he refused.

Cross-examined, he did not obtain defendant's consent before making the alterations. He made no inquiries as to his rights in respect of the wall. He did not assume that the wall belonged to him, but he assumed that he had easements there.

Mr. Edw. Richards, architect and surveyor, of Torquay, who was employed by the plaintiff to prepare plans for the alterations in question, pointed out that had taken place, and the difference between the old and the new building. There was an old beam supporting the archway, and when the archway was pulled down he (witness) thought it advisable to insert two steel girders where the old beam had been. All that had been done at the hotel was to pull down the front wall and to build up a new one. Nothing else was interfered with. The new wall was not so heavy as the old one. The two steel girders supporting the new wall rested in the same hole that the old beam did. In his opinion the alterations had not damaged in any way the stability of the defendant's wall.

Cross-examined, the cracking of the balcony stone was caused by the weight of the arch. The back of the arch was firm and the weight it had to bear was about the same as the front.

Mr. Henry Hardy, architect and surveyor, of Westminster, gave evidence as to making a survey of the plaintiff's and defendant's premises, and said that he considered the alteration a great improvement.

Mr. Bramwell Davis, in opening the defence, said that his contention was that the wall belonged to defendant by virtue of a lease of 1869, which had since been renewed, but undoubtedly the owner of the Royal Hotel a right of easement. That easement was principally the archway, and the plaintiff had no right to alter that.

Mr. Edw. Appleton, an architect of Torquay, said that he was called in by defendant in October, 1893, and in his opinion the wall was the property of the defendant.

His Lordship, after hearing further evidence and the addresses of counsel, in giving judgment, said it was clear that the wall was a completed structure before the Royal Hotel in its recent form was built. But even allowing that the defendant was an owner of the wall, the plaintiff had the right of support from it. In rebuilding the arch and altering the position of the windows the plaintiff, so far from putting additional burden on defendant, had done him material advantage. He held that under the leases defendant was entitled to the wall on the east side of the passage, that is the wall in dispute, subject to the plaintiff's right to support. He should make an order to restrain the plaintiff from putting ornamentation on the defendant's wall, and should restrain the defendant from interfering with the plaintiff's stud work or other works and alterations in or upon the passage. He declined to give costs to either party.

## MEETINGS.

## SATURDAY, JULY 14.

Architectural Association.—Visit to Oxford.  
Architectural Association Camera Club.—Visit to Battersea Polytechnic Institute. 2.30 p.m.

## MONDAY, JULY 16.

Society of Antiquaries.—General Meeting, to be held in the Public Hall, Cannon-row. 8 p.m.

## TUESDAY, JULY 17.

Cambrian Archaeological Association. Annual Meeting, to be held at Cannon-row in conjunction with the Royal Society of Antiquaries of Ireland.

## WEDNESDAY, JULY 18.

Builder's Foremen and Clerks of Works' Institution.—Half-yearly meeting of the members. 8.30 p.m.  
Cambrian Archaeological Association.—Annual meeting, Cannon-row (continued).

## THURSDAY, JULY 19.

Cambrian Archaeological Association.—Annual meeting, Cannon-row (continued).







## CONTRACTS AND PUBLIC APPOINTMENTS.

## CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Making up Roads, Paving, &c.	Beckenham Loc. Bd.	J. A. Angell	July 16
Additions to Chapel, Plessey, Penarth.	County Union	John & Thornley	July 17
Fortiary, Workhouse.	G. & J. Reiss	do	do
Schools, Alnwood.	R. L. Tison	do	do
Roads and Sewers (1,800 yards)	Hayward & Heath Loc. Bd.	Official	do
Passenger Station, Ely, near Cardiff.	G. W. Ry. Co.	do	do
Eight Houses, Beckondyke.	L. & N. W. Ry. Co.	do	July 18
*Paving & Kerb.	Woking Local Board.	A. M. Fowler	do
Enc. and Boiler House, &c.	Stockport Corp.	do	do
Stone and Tarn Buildings, Trolan.	Thos. Butler	do	do
Sea-wall.	Cotford (York) L.B.	A. Boulton	July 19
Pipe Laying 24 miles, East Kilbride.	Luark County Coun.	Leslie & Reid	do
Additions to School, Tullestou D'Arcy.	Met. Asylums Board.	P. M. Beaumont	do
*Fever Hospital, Gloucester Hill.	Met. Asylums Board.	T. W. Aldwinckle	do
Additions to Schools, Stamford, & District.	Managers	do	do
Colvert, Norden, near Radford Lane.	Committee	do	do
*Upstairs and Wardens, S.E. Hospital.	Met. Asylums Bd.	Official	do
Water Supply, Richmond, Ireland.	M. R. Co.	do	do
Waterway Chapel and Schools, Keshley.	Bahabun Union	do	July 20
Waterworks, &c.	Ballyshannon (Ireland) Union	W. & J. B. Bailey	do
Parish Hall, Antrim, N.B.	Harrow Local Board	J. H. Russell	July 21
*Broken Granite.	Chestnut Local Bd.	T. Chatterton	do
Kerling, Channing, &c.	Bury Local Bd.	S. Towson	July 23
Two Black Sewer, Mount St.	Southgate Loc. Bd.	J. Cartwright	do
*Paving Roads.	Southgate Loc. Bd.	C. G. Lawton	do
Recreation and Additions.	Clint	Official	do
Belonging Bridge, Sandwick, West, near Richmond, York.	County Authorities	do	do
Two Groynes and Outfall, East Cliff.	Dover Town Council	do	July 24
*Stabling.	Lewis Angell	do	do
*Outfalls on Claybury Asylum Estate.	G. T. Hine	do	do
*Making up Roads.	West Ham Council	G. T. Hine	do
*Machinery for Drainage Works.	P. E. C. Aspinall Com.	do	do
*Power and Road Making.	East Malvern L. Bd.	J. C. Mellins	July 25
*Broken Granite.	Hammersmith Valley North Waterworks L. Bd.	H. Mar.	do
*Power Extension, Hawkhead.	Ulverston T. R. & A.	J. Greenwood	do
*Broken Granite, Hindley, N.B.	North Waterworks L. Bd.	R. Bown	do
*Six Sanitary Spins.	Hants County Asylum	J. Robinson	do
*Construction Buildings.	Tunbridge Wells Corp.	H. M. Caley	do
*Water Supply and Warming Apparatus.	Met. Asylums Bd.	A. & C. Harston	do
*E. Hospital.	Met. Asylums Bd.	M. C. Hurst	July 26
*Schools, Caversham, Flapton.	Met. Asylums Bd.	do	do
Additions to Farm, Cumblands, Dring, Cumberland.	Wm. Thompson	do	July 27

## CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*External Iron Staircases.	West London Sch. Dist.	Official	July 27
Hydrants and Fire Extinguishing Apparatus.	do	do	do
*Electric Lighting Station, &c.	Tunbridge Wells Corp.	A. Ardron	do
Baths and Washrooms, Gillingwade School and Classroom, Sutton-in-Ashfield.	Printrevis Methodist Chapel Trustees	G. Kyle	July 28
Schools, Merrywood, Redminster.	Bristol School Board.	Official	do
*Storage, Beeston, &c.	Sutton School Board.	J. Newton & Son.	July 30
*Revised Disposal Works.	Longborough T. C.	A. W. Cross	July 31
*Nineteen Rugs and House.	Lee Lodge Estate	F. & W. Stocker	Aug. 2
*Sewerage Works, &c.	Doncaster T. R. & A.	Official	Aug. 2
*Additional Block at Workhouse.	Christchurch Union	E. H. Burton	Aug. 25
*Painting Works & Drives.	War Department	Official	No date
*Painting Station, Buxingham.	Lancashire Joint Com.	F. & G. Holme	do
School Chapel, Howard Street, Burnley.	Printrevis Methodist Chapel Trustees	A. Robinson	do
Sewer, Neil-lane.	Local Board	A. H. Mountain	do
Additions to the Manor, Corden-terrace.	Burley Bldg. Society	Thos. Bell	do
School Enlargement, Hilary, Norfolk.	Rev. Canon Beecher.	do	do
Two Cottages, Landmord, Wells.	W. Prior	do	do
Additions to School, Longbridge.	Nottingham Sch. Bd.	Evans & Juley	do
Club Premises, Broad.	Wm. Cissold	do	do
Additions to School, Springfield, Chelmsford.	F. E. L. Harris	do	do
Warehouse, Shop, &c. Walside.	Lincoln Right. Com.	J. Smith	do
Offices, Queen-street, Peterboro.	Rippon & Co.	Jas. Ruddle	do

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Appointments to be made.
*Sanitary Inspector.	Billingdon Vestry.	10d. &c.	July 20
*Headmaster.	Newcastle-under-Lyme School of Art.	do	July 24
*Clerk of the Works.	Shoreditch Guardians.	do	July 25
*Clerk of the Works.	Hill Branch Library.	do	do
*Stapleholder.	Liverpool.	37d. &c.	Aug. 1
*Assistant Surveyors, R.R. Civil Staff.	Civil Service Com.	do	do

Those marked with an asterisk (\*) are advertised in this Number.

Contracts, pp. iv, vi, viii, and xx. Public Appointments, p. xviii.

CARLOW—For the erection of a Masonic Hall, Abby-street, for the Carlow Freemasons' Mr. Wm. Morrison architect, Ogles' Hotel, Carlow. No plan submitted. £750 0 0  
Isaac Weir, Carlow (accepted) 670 0 0

CHESHAM—For the supply of granite kerbs, flags, cubes, &c., and laying same, for the Local Board. Mr. C. L. Whitehead, junr., C.E., Chesham. Estimates by engineer.  
F. D. Pott... £245 10 0  
Lee & Sons... £245 10 0  
Free, R. & Co... £245 10 0  
J. M. Shephard... £245 10 0  
Wm. Wadsworth... £245 10 0  
Hiram Moorcroft... £245 10 0  
The Imperial Stone Co... £245 10 0  
The Victoria Stone Co... £245 10 0  
Co., Croft, near Leicester... £245 10 0  
Stuart's Granolithic Stone Co... £245 10 0

DAREMTH—For the erection of a staff block, and making alterations and additions to the laundry at the School for Imbeciles at Daremth, Kent, for the Metropolitan Asylum Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities by Mr. W. T. Farthing.  
Goldson & Son... £2,800 0 0  
Shillington & Son... £2,800 0 0  
J. Lawrence & Son... £2,800 0 0  
H. Wall & Co... £2,800 0 0  
Leslie & Co... £2,800 0 0

DARTFORD—For the construction of class-rooms, at the school, Wilmington, for the School Board. Mr. G. H. Tall, C.E., Goodhead. Estimates by Mr. G. H. Tall.  
Kingwell... £175 0 0  
Digging... £175 0 0  
\*Accepted subject to approval of Educational Department.

ENTER—For the execution of work at the Lower Market, for the City Council. Estimates by Mr. G. H. Tall.  
Kingwell... £175 0 0  
Digging... £175 0 0  
\*Accepted.

FROME—For the supply of 40 tons of socket, &c., pipes for the Rural Sanitary Authority. Mr. Allen Greenwell, C.E., Surveyor, &c., Frome, for the Metropolitan Asylum Board. Messrs. J. S. Roberts, Ltd., 15, Leadenhall-street, E.C. Quantities by Mr. G. H. Tall.  
J. S. Roberts, Ltd... £2,800 0 0  
J. S. Roberts, Ltd... £2,800 0 0  
J. S. Roberts, Ltd... £2,800 0 0  
J. S. Roberts, Ltd... £2,800 0 0

HOLMESFIELD (Derbyshire)—For the erection of school buildings, for the School Board. Mr. Walter J. Sykes, architect, Hoyland, near Barnsley. Estimates by Mr. Walter J. Sykes.  
Greenwood & Co... £1,500 0 0  
Hy. Harrison & Son... £1,500 0 0  
Thos. Margerison & Son... £1,500 0 0  
Ellis Outram, Holmesfield (accepted) £1,500 0 0

Wm. Cooper... £195 0 0  
Chadwick & Sons... £195 0 0

Chadwick & Sons... £195 0 0  
Plumbers G. & P... £195 0 0  
Chadwick & Sons... £195 0 0  
W. Hy. Rawlin... £195 0 0  
Mellows & Co... £195 0 0

KEA, Cornwall.—For erecting Kea Church, near Truro, Cornwall, for the Vicar and Churchwardens, from designs by Mr. Geo. H. Fyfe, F.R.S.A., & Queen Anne's gate, Westminster, S.W. Quantities by Mr. R. Henry Hale, surveyor, 35, Old Queen-street, N. & J. Harris... £5,300 0 0  
Jas. Julian... £4,971 0 0  
Philip Blouey... £4,971 0 0

LEAMINGTON.—For the erection of school buildings, &c., Leamington-street, Mr. Frederick Foster, architect, Leamington and Coventry. Estimates by Mr. Frederick Foster.  
J. H. G. Hine... £2,800 0 0  
C. H. G. Hine... £2,800 0 0  
A. H. Wincott... £2,800 0 0

LONDON.—For interior painting at Cranpton-street School, for the London School Board. Estimates by Mr. G. H. Tall.  
V. Goad... £2,800 0 0  
Rice & Sons... £2,800 0 0  
Triggs... £2,800 0 0

LONDON.—For redrawing and sanitary work, 2 and 2a, Hanover-street, for Mr. Constance, The Sanitation Com., architect, Leamington and Coventry. Estimates by Mr. Constance.  
Wright... £195 0 0  
Drillon... £195 0 0

LONDON.—For the erection of nautical institute, &c., for the parish of St. Mary, Haggerston. Mr. Richard J. Lovell, architect, 46, Queen Victoria-street, E.C. Quantities by Mr. Richard J. Lovell.  
H. & R. Roberts... £1,700 0 0  
Holloway & Co... £1,700 0 0  
Gondal... £1,700 0 0

LONDON.—For the supply of a sluice, &c., for the London County Council. Estimates by Mr. G. H. Tall.  
C. Hansen & Sons... £1,700 0 0  
Thames Ironworks Co... £1,700 0 0  
Lobnitz & Co... £1,700 0 0  
J. H. McIntyre & Co... £1,700 0 0  
Leamington & Co... £1,700 0 0  
Rieming & Ferguson... £1,700 0 0  
L. Ltd... £1,700 0 0

LONDON.—For the erection of a generating station in connection with the electric lighting of the Victoria Embankment, &c., for the London County Council. Estimates by Mr. G. H. Tall.  
Kirk & Randall... £2,800 0 0  
Kirk & Randall... £2,800 0 0

LONDON.—For the supply and fixing of telescopic weirs at Thames Ironworks. Estimates by Mr. G. H. Tall.  
Co... £1,700 0 0  
Thames Ironworks Co... £1,700 0 0  
J. H. McIntyre & Co... £1,700 0 0  
Leamington & Co... £1,700 0 0  
Rieming & Ferguson... £1,700 0 0  
L. Ltd... £1,700 0 0

LONDON.—For taking up old and laying new drainage system throughout, at Oban-street School, for the London School Board. Estimates by Mr. G. H. Tall.  
C. Hansen & Sons... £1,700 0 0  
Thames Ironworks Co... £1,700 0 0  
Lobnitz & Co... £1,700 0 0  
J. H. McIntyre & Co... £1,700 0 0  
Leamington & Co... £1,700 0 0  
Rieming & Ferguson... £1,700 0 0  
L. Ltd... £1,700 0 0

LONDON.—For pulling down No. 10, Marshall-street, W., and erecting new offices, quarters, task rooms, and disinfectors, for the Guardians of the Westminster Union. Messrs. J. W. Waldram & Son, surveyors, 13, Buckingham-street, Adelphi, W.C. Quantities by Mr. J. W. Waldram & Son.  
J. B. Colliv... £2,800 0 0  
P. G. Minter... £2,800 0 0  
C. P. Roberts... £2,800 0 0  
J. Lang... £2,800 0 0  
H. & E. Les... £2,800 0 0  
J. Bendon... £2,800 0 0  
Lancaster & Co... £2,800 0 0  
N. L. Dutton... £2,800 0 0  
W. A. Pryor... £2,800 0 0

LONDON.—Accepted for kerbing, channelling, &c., Weymouth, Forest Hill, for the Guardians of the Westminster Union. Messrs. J. W. Waldram & Son, surveyors, 13, Buckingham-street, Adelphi, W.C. Quantities by Mr. J. W. Waldram & Son.  
J. B. Colliv... £2,800 0 0  
P. G. Minter... £2,800 0 0  
C. P. Roberts... £2,800 0 0  
J. Lang... £2,800 0 0  
H. & E. Les... £2,800 0 0  
J. Bendon... £2,800 0 0  
Lancaster & Co... £2,800 0 0  
N. L. Dutton... £2,800 0 0  
W. A. Pryor... £2,800 0 0

LONDON.—For wood-paving works, Gloucester-road, Palace Gate, &c., for the Vestry of St. Mary Abchurch, Kensington. Mr. Wm. Weaver, C.E., Surveyor, Town Hall, Kensington, N.W. Quantities by Mr. Wm. Weaver.  
Improved Wood Paving Co... £1,700 0 0  
Nowell & Robson... £1,700 0 0  
Wemyss & Co... £1,700 0 0

LONDON.—For the erection of residence in Carlos-place, Mount-street, for Mr. G. F. Fests. Messrs. Lewis H. Isaacs & Henry L. Florence, architects. Estimates by Mr. G. F. Fests.  
Lancaster & Co... £2,800 0 0  
G. H. & A. Bywaters... £2,800 0 0  
Simpson & Son... £2,800 0 0

LONDON.—For alterations and repairs to St. John's Church, Broad-court, Drury-lane, for the Vicar, Ch. wardens, and Church Council. Messrs. Gordon M. Hills & Son, architects. Quantities by Mr. Charles A. Bassett Smith.  
C. H. G. Hine... £2,800 0 0  
A. J. Hocking... £2,800 0 0  
S. Hunt... £2,800 0 0

LONDON.—For alterations at No. 60, High-road, Tottenham, N., for Mr. G. Grippes. Mr. Alfred Richards, surveyor, 18, Finsbury-square, E.C. Quantities by Mr. G. Grippes.  
M. A. Humphreys & Son... £2,800 0 0  
H. Knight & Son... £2,800 0 0

LONDON.—For the erection and completion of New Armoury and Officers' Divisional Quarters, at Clerkenwell, E.C., for the Metropolitan Asylum Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities by Mr. A. & C. Harston.  
W. King & Son... £2,800 0 0  
Langdale, Hallett, & Co... £2,800 0 0  
Holloway Brothers... £2,800 0 0

LONDON.—For the erection of a patients' block and two staff blocks at the Eastern Hospital, the Grove, Hammersmith, for the Metropolitan Asylum Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities by Mr. A. & C. Harston.  
W. Shumair... £2,800 0 0  
Holliday & Green... £2,800 0 0  
H. Wall & Co... £2,800 0 0

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# The Builder.

VOL. LXVII, No. 265.

JULY 21, 1894.

## ILLUSTRATIONS.

"La Muse de la Source."—M. Jean Hugues, Sculptor .....	Single-Page Ink-Photo.
"Les Adieux d'une Hirondelle."—M. Felix Charpentier, Sculptor .....	Single-Page Ink-Photo.
Illustrations to Mr. Somers Clarke's Paper on "The Devastation of Nubia" .....	Double-Page Ink-Photo.
Design for Church, Abbeydale, Sharrow, Sheffield.—Mr. A. H. Skipworth, Architect .....	Two Single-Page Ink-Photos.
Ashton Grammar School, Dunstable.—Mr. E. R. Robson, F.S.A., Architect .....	Double-Page Photo-Litho.

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### London Streets and Buildings Bill: Revised Form.



It is stated that the process of bringing this Bill into its present form has cost about 20,000l. The revised form presents one or two important improvements in detail, and the arrangement and grouping of some clauses has been modified so as to render it more logical and connected in form. But some of the main objections to it which we noted at the outset are entirely untouched.

We printed last week a statement sent to us by Mr. Cates as to the points in which the Bill has been modified, obtained before the actual publishing of the Bill, which, however, took place the day we went to press, but too late to correct the numbering of the clauses, which, as Mr. Cates observed in the footnote to his communication, would probably be different in the new Bill. Mr. Cates, however, must have written rather in a hurry, for he gives as among the clauses modified Clause 7 (Clause 12 in the new Bill), which gives the Council power to order a street, in special cases, to be made wider than 40 ft., but not exceeding 60 ft. Now this clause is not modified at all except in one way which Mr. Cates does not mention—viz., that its operation is restricted to streets "not within two miles of St. Paul's Cathedral." That is the only alteration from the clause in the original Bill, and a very serious one; but the provision as given in Mr. Cates's communication is in the original Bill word for word.

This miserable and inadequate provision for the width of new streets is only too typical of the spirit of vestrydom in which the Bill is conceived, and it justifies the comment which was made by Mr. Howell, who on Monday last moved in the House of Commons the conventional amendment that "the Bill should be considered that day three months," to the effect that "a great province like London ought to be governed not by Private Bill legislation, but by public Acts." No doubt the remarks of subsequent

speakers, as to the importance of passing a Bill on which so much labour had been expended, were justifiable, and in fact Mr. Howell could hardly have expected to do more by his amendment than relieve his own conscience; but it is a deplorable thing, all the same, that a Bill of this kind should be conceived in such a narrow and paltry spirit, with such a mere regard for vested interests, and such a want of perception of the wider public interests involved in a Bill dealing with the construction and laying out of a great city. In regard to this one item of the width of streets for London the provisions of the Bill are miserable, and are calculated to stereotype one of the greatest mistakes that can be made in a town, both for appearance and for sanitary conditions, viz., that of having streets too narrow in comparison with the height of the houses. In a former article on the draft Bill\* we drew attention to this defect, this proposal to make the average recognised width of street 40 ft., with a power to the County Council to require a greater width of street under special circumstances, but in no case to require a greater width than 60 ft. We may repeat here some of the practical illustrations of what this really means, which were brought forward personally by the editor of this journal at one of the meetings of the Institute of Architects where the Bill was discussed. Chancery-lane represents what the Bill proposes as the average and usually accepted width of street for London for the future. Is that the kind of street which we ought to contemplate as the regulation width for future London streets? Then look at the magnificent limit of "60 ft." for streets where for special reasons, extra width is desirable! This extra width is to be required "when the Council shall deem it expedient in the public interest that the street or way should by reason of its length or importance or being so situated as to be likely to form part of an important line of communication or for other sufficient reason be of a greater width than forty feet." Sixty-three feet is the width of the eastern portion of Oxford-street, which represents very well that class of street which "forms part of an important line of communication"; and that

street, besides not looking like a first-class street according to modern ideas, is manifestly too small for its traffic; but that is rather wider than we are to expect from the London County Council's new Bill for the largest and best London streets of the future. The widest part of High Holborn is 115 ft., and even there the space is often insufficient for the free progress of the traffic, partly no doubt in consequence of the cab-rank and one or two other obstacles in the centre, but these at the most cannot deprive the roadway practically of much more than 10 ft.; say, however, that they represent the odd 15 ft.; that leaves 100 ft. for a road which is not in the least too wide for its position. But according to the County Council's Bill we can never have such a street as that again; we can never by any possibility have such a street as Portland-place (the only street in London which at all recalls the ample proportions of the best Paris streets). We can never have again even such a street as Regent-street (86 ft.) or St. James's-street (80 ft.). It is really contemptible that such conditions should be offered for such a city as London. If it is a question of purchasing more land or paying more compensation for obtaining wider streets, surely it is worth while to spend some public money on an object which is so manifestly for the public benefit; and it is even a question whether additionally wide streets would not partially pay for themselves. As Professor Kerr very well put it, at the same meeting of the Institute which has been already referred to, when on new land a building is set back, the loss of land is a loss of back land; the compensation must go on the value of that land, while against that there must be set off the advantage to the property of the wider street, and the one would often cover the other. But all these arguments and representations are in vain; indeed the matter is made worse in the revised Bill than before, for even the power to insist on the 60 ft. street is now limited by being applicable only to sites "not within two miles of St. Paul's Cathedral." The very evil of that central and crowded district is the hereditary narrowness of the streets; the making of a new street ought to be hailed as an opportunity for the commencement of a better state of things, and might be expected to operate in reality as an improvement

\* Builder, December 23, 1893.





## THE DEVASTATION OF NUBIA.\*

By MR. SOMERS CLARKE, F.S.A.

**H**OWEVER far back we may go in the history of Egypt or in the evidence given us by its monuments we find that the irrigation of the country was an object of careful attention to those in authority.

By basins, canals, &c., the Nile waters have been for centuries so regulated that the country is more productive and better watered than by the mere rise of the river.

So long as we have Egypt in charge, so long is it no more than our duty to do the best we can for regulating the Nile waters. Too high a Nile means an ill nearly as great as too low a Nile. The country is in one case drowned, in the other it is starved.

What the Nile water is to Egypt is well described by Mr. Alfred Milner in his book, "England in Egypt," chap. ix. He says:—

"Egypt, as a geographical expression, is two things—the Desert and the Nile. As a habitable country it is only one—the Nile. Every square foot of cultivable land has, at some time or other, been brought down by the river which now flows in the midst. At one season a shallow and sluggish stream of which but little reaches the sea, at another a sea itself, here spreading in a vast lake over the whole face of the country, there pouring along through numerous channels towards the ocean."

The waters cover the land, a rich deposit of mud is found when they retire, and unless the country has been starved or drowned the harvest follows. It is now found that by more careful regulation of the waters and by drainage a second harvest may be got, and it is to regulate the waters and increase the productive power of the land that various schemes have been proposed. However little we may sympathise with the details of the schemes now before the public, we cannot, therefore, reasonably shut our eyes to the fact that the object to be attained is a worthy one.

It will be well to hurry on at once and consider the scheme now set forth in the Monumental Report published by the Department of Public Works in Egypt, and for which Mr. Willcocks is responsible.† I am not competent to criticise the scheme from the point of view of an engineer, but I have sufficient technical knowledge to enable me to pay my tribute to the evidence of untiring energy and unremitting care which the report shows on every page of it.

It is to the frightful devastation which will be caused by the construction of a reservoir as proposed that objection must be taken. The country, the people, everything that makes Lower Nubia itself, and last, but not least in our eyes, all its ancient monuments and the evidences of its history, will be absolutely wiped out. Can it be said that the engineers have arrived at a reasonable solution of the question laid before them when the method they propose to adopt involves the devastation of one part of the country for the not very certain benefit of another?

Several schemes are proposed in the report:—

- A. In constructing a reservoir with its base or retaining wall at Gebel Sileleh.
- B. In a reservoir with its base on the first cataract a little south of Assouan.
- C. A third for a reservoir with its base a little south of the island of Philæ.
- D. A fourth for a reservoir with its base some miles south of Philæ, at Kalabshah.
- E. A reservoir in the Wady Rayyan.

Although the scheme B is that which comes most prominently before us, it is necessary to mention the others here, as they must needs be referred to.

Taking into consideration the magnitude of the reservoir projects, the Egyptian Irrigation Department asked that a com-

mission composed of three of the most eminent hydraulic engineers in Europe might be appointed for the purpose of considering the several schemes, and advising the Egyptian Government as to which of them should be adopted. Nothing could be more fair than this. The pity of it is that the whole thing seems confined within a circle of engineers who, in sheer Philistine lightness of heart, and utter disregard of everything but an increase of revenue to Egypt, an increase the amount of which, as stated in the report, is open to grave doubt, are prepared to commit a more desperate act of devastation than the history of any civilised country can record, and to place the safety, the very existence, of Egypt in possible peril.

The subject may be approached from two sides—one that of Egypt, the other that of the cultivated world. Egypt sees a prospective increase of revenue, but at the expense of Nubia. She thinks of to-day. The cultivated world outside has perhaps thought too much of yesterday.

Mr. W. E. Garstin, C.M.G., Under Secretary of State for Public Works, in his "Note" on Mr. Willcocks' project, refers to certain objections that may be made to the construction of a storage reservoir in the Nile valley itself. Of these, he makes a summary as follows:—

1. That its construction presents insurmountable engineering difficulties.
2. That from a strategic point of view it would be inadvisable to expose Egypt to the danger of having its summer water supply suddenly cut off by a hostile force seizing the dam.
3. That an earthquake, or even faulty construction, might expose it to an accident which would perhaps produce a catastrophe of appalling magnitude.

It will be sufficient for me here to deal with the utter destruction of objects of antiquity which would be caused by constructing a reservoir with its base either at Philæ or at Kalabshah. The island of Philæ is, without doubt, one of the most interesting spots in the world, and not one of the least beautiful, but I wish particularly to impress upon you that it is but one object of many that must be destroyed. The public has been led to think that the evil stops with the destruction of Philæ. Not at all. Then we are told that the temples can be moved. Mr. Willcocks proposes to rebuild the structure or structures on the adjoining island of Bigeh. Sir Benjamin Baker will screw up the whole affair.

I will not detain you long with a description of the island of Philæ and its treasures, because it is a place visited by very many people who run over from Assouan.

To begin with the island itself. It is a mass of granite boulders standing up in mid-stream. Quay walls surround the island. These have been built so as to enlarge the surface-area of the island, and in themselves have no little evidence of history. In one place the masonry, by its tool-marks, bears strong evidence of workmanship of the nineteenth dynasty. It seems to be older than any structure we now see on the floor of the island.

In other places may be seen straight joints between two adjoining parts of the quay wall; there are evidences of enlargements.

In other parts are projecting quays or bastions, and these show a curious system of construction, for in plan the front of these bastions is not a straight line exactly at right-angles with the sides, but is slightly concave—a piece of an arch laid on its side; this has evidently been done in order to resist the pressure of the stuff filled in to raise the ground level behind the retaining wall. I have said enough to show that the quay walls which surround the island are well worth preserving, and that if Philæ is to be screwed up the very girdle walls must also be raised. When we have ascended to the floor level of the island we find upon it not only the well-known temples and pylons, which appear

in the photographs and drawings we often see, but a great many things, equally important but less striking in the eyes of the tourist. We find the ground encumbered by masses of crude brick-walls of houses, some built up against the temple walls, others standing by themselves. I fear that even the museum authorities at Ghizeh look upon these as rubbish, but they are in fact full of history. The most important of these brick remains is the ruin of a great brick wall within which, according to Egyptian custom the temple was enclosed. The remains of such a wall enclose the group of temples at Karnak, and are very perfect around the temple of Deir el Medineh, but the necessity for such a wall on the Island of Philæ where on one side—the west—is left but little room between the wall and the river, seems not very obvious.

Following a custom very usual in Egyptian brickwork, the courses are not laid horizontally. They undulate, being laid in large curves rising a little above and descending a little below a line parallel with the horizon. A considerable number of the brick remains are Coptic, and although the Copts certainly wrought terrible damage to the works of ancient Egypt, the buildings they put up are part, not only of the history of Philæ, but of Egypt and of religion, and should not be condemned as rubbish. Towards the north-east part of the island are the remains of a Coptic church, built with stones from Egyptian temples. These all seem to be of a somewhat late period. The church, too, is not of the plan commonly found in Cairo, and which seems to have been accepted as the normal plan of a Coptic Church, namely, that it must have three apses in a row, each with its altar. This church has but one apse. Its plan is in fact that of a small basilica, with an apsidal end to its central nave and flat walls at the ends of its aisles. This type of plan, however, was very common above Philæ. In "Letters from Egypt and Ethiopia," by Lepsius (Bohn, 1853, at p. 210), he gives us a similar plan far up the Nile, in the Wadi Gazal. I know but one instance of it north of Philæ, at El Tum, near Edfou, and perhaps one quite far north, and mentioned in the recent publication of the Egypt Exploration Fund. But the Coptic Church on Philæ is not quite according to the rule of its neighbours, for it has the remains of a stair rising at the end of the south aisle, immediately to the right of the apse. In all other instances I have seen, the stair is at the west end of the aisle. Near the Coptic Church are the remains of a structure which looks like a small triumphal arch of Roman detail. It may be of the time of Diocletian. This little structure seems to me to be one of the most curious in Egypt, for it shows us the extraordinary tenacity with which the Egyptians clung to custom. The detail is, as I have said, Roman, but the method of construction is, as far as he could apply it, the same the Egyptian mason had used in the very earliest buildings we know. Contrary to the custom of most masons, the Egyptian built up the stones first, and cut out the architectural features afterwards. He chipped away at the face of his stone walls until at last he developed the architectural features intended. I am not aware that there is any evidence that the Romans ever did this.

Then there is a further piece of ingenuity, one which was the direct outcome of building where wood was scarce. The arch was well known to the Egyptian constructor, but he rejected it for monumental works. In brickwork, on the other hand, it was largely used, and with much skill he built his brick arches without the use of the great timber frame or centre which we use.

In the present case the arches are of stone, and each stone is worked with a sort of overhang at the back, by which means it cannot slip forward on the sloping side of the arch stone already laid. Thus the need for a wood frame to support the stones until the key-stone was placed is done away with. There are many more objects of interest to which I

\* A Paper read at a meeting of the Archaeological Institute, on Wednesday, July 4.

† "Perennial Irrigation and Flood Protection for Egypt." Cairo: National Printing Office. 1894.

could call attention, little things which do not come within the ken of the hurried visitor, and are not told us in the books of Murray or Bedekker, but they are not the less valuable, and must be lost by the construction of a Philæ reservoir.

It may be well, taking the island of Philæ as a starting point, to give a list, so far as I am able, of the various objects of antiquity which will be submerged by the construction of a dam at the place selected—a line of rocks a little below the island, and where the nature of these rocks lends itself to the construction of such a work, if it be necessary, with greater security than elsewhere. Here, then, is the list:—

- 1.—Of Philæ we have heard.
- 2.—The inscriptions on the surrounding islands and rocks.
- 3.—The remains of the temple on the island of Bigeh.
- 4.—The remains of the temple at Debôt, with its inclosing walls.
- 5.—Dimri: here are a very few relics on the surface, but an examination of the place would certainly reveal much more than we now see.
- 6.—Kertassi, with its large quarries full of inscriptions, and the great girdle wall, in masonry surrounding the site of the temple.
- 7.—Tafeh, with its very perfect little temple and the remains of houses in masonry, some in remarkable preservation.
- 8.—Kalabshah, a place of royal magnificence. Nowhere else on the Nile is the impression more fully conveyed of the solemn stateliness with which the approaches to an Egyptian temple were laid out, and then its courtyard is full of graffiti of greatest value. Not being within easy reach of Assouan, the tourist does not visit it, and consequently the engineer's report does not even mention it.
- 9.—Abu Hor: here is a quay wall, and further investigation would no doubt reveal much.
- 10.—Dendur: here, standing a little back from the river, but not sufficiently raised to escape the devastating flood, is a large terrace of masonry, standing in front of the temple. Behind stands the temple itself in very good preservation.

11.—Koshetmeh. Here is a great fort of crude brick, belonging to the middle empire. The remains of many buildings surround it buried in the sand.

12.—Dakkeh (*Pselchis*). A temple with many parts still well-preserved. One year's flood would bring most of it to the ground as it does not stand on rock.

13.—Köbbän.—A magnificent specimen of a rectangular fort, far more perfect than that at Koshetmeh. Temple ruins adjoin it.

14.—Korti. The site of an ancient city, which should be carefully examined.

15.—Maharagah, called also Offedinah (*Hierascaminos*), a late structure of most unique plan.

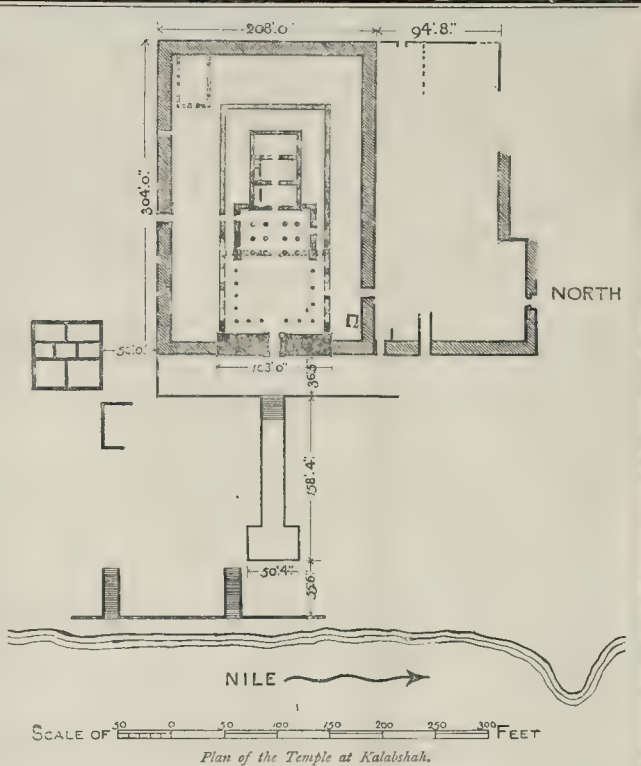
16.—The ruins of a Coptic church, a little north of Sebuia.

If the reservoir lifting the water to the level proposed be made just below the island of Philæ, it will submerge to a greater or less degree, and will certainly ensure the ultimate destruction of everything named in this list. The reservoir would be full 116 miles in length.

If the reservoir be made at Kalabshah, south of Philæ, the list of antiquities to be named must begin with the temple of Kalabshah, No. 8 in the list, but we must add several rock tombs which flank the fertile plains of Derr, and finally,

The plain of Aniba, full of unexplored sites.

From the foregoing statement it is evident that if we approach the matter from the archaeological side only, the devastation will be tremendous; but in addition to this I must mention in passing that from 25,000 to 30,000 peasants will be displaced, their homes and native places utterly destroyed. I might say a great deal on the cruelty of this, done as it would be under the ægis of England, a country which has hitherto professed, and not without truth, to have the interests of the peasantry at heart.



This concludes the list, and I will now take a few of the places in detail.

On the wall there hang some plans of temples, &c., that would suffer by the devastation. Philæ has already been described.

Kalabshah is certainly one of the most magnificent ruins on the Nile. The great girdle walls with which it is surrounded are of particular interest, and for the following reasons:—In Egypt, from Assouan downward, where the flow of the Nile valley is often of considerable width, the temples, as also the towns, have been enclosed by great walls of crude brick. Such a wall has been already referred to as still existing in part at Philæ. When we pass the first cataract the character of the valley changes, and becomes generally more narrow. The cultivable ground is a small strip lying on the border of the river and at the foot of the arid sandstone hills and cliffs which form the sides of the Nile valley. It may have been because stone was near at hand, or it may have been because the alluvial soil was thought too precious to be made into bricks; but in fact, when we pass into Nubia we find the girdle walls generally built of masonry, and the finest specimens that remain to us are those at Kalabshah.

In the photograph taken from the northeast (see *lithograph illustration*), the girdle wall can be seen, crowned with an overhanging cornice, and standing at a lower level than the walls of the temple which rise above it.

Another point to be especially observed at Kalabshah is the illustration it gives us of the way in which the Egyptian architect laid stress on the approach to the temple.

The faithful were not permitted to turn a corner and suddenly find themselves confronted by the building. They must be led up to it and duly impressed. The immense avenues of sphinxes from Luxor to Karnak, making the most of an approach on the level, or the still more dignified approach to the terrace temple known as the Deir el Bachri

are superb examples of effect. But these were at the great centre of Egypt—Thebes.

At Kalabshah we are away in the country. None the less, there was no abatement in the efforts made by a grand approach to produce an impression.

As my plan shows, arriving by the great highway, the Nile, we find our boat drawn up at the base of a stately quay-wall, some 18 or 20 ft. high. This is pierced by two great flights of steps, some 20 ft. wide. Mounting these, we find ourselves on a large terrace, extending its length beside the river, and going back at right-angles with it some 200 ft. At this distance, back from the river, rises another terrace, some 8 or 10 ft. high, and reared upon this is the huge pylon, wider than the west front of Westminster Abbey.

It should be said that the pylon has not its longer axis parallel with the front of the hypostyle hall, as shown on my rough plan. The longer axis is slightly deflected.

At a level, intermediate between that of the lower and upper terrace, there is a long terrace, 20 ft. wide and 158 ft. long, which runs out at right-angles, reaches nearly to the river, and follows approximately the axial line of the temple. This terrace ends towards the river in a square platform, whilst the temple is reached from it by a flight of broad, low steps.

These terraces are now very perfect, and with two fine sycamores spreading their great green heads to the sky, they present an appearance quite as beautiful as, and I think more stately than, anything at Philæ.

Passing through the pylon we find the temple itself built on a most majestic scale. The photograph (see *lithograph*) shows the front of the hypostyle hall.

My plan shows the great girdle walls within which it is enclosed, solid structures, 6 ft. thick, starting from the back of the pylon. Outside these comes another wall, which starts right and left from the ends of the pylon, and then encloses a considerable



space outside the 6 ft. walls last described. The outer wall is not less than 12 ft. thick, and in some places more. It is formed of two outside skins of masonry, the interspace being filled with stone chipping, and perhaps also with earth, but this has all been removed, probably for purposes of agriculture. To the north there is yet another wall, with outer and inner skins of masonry, and although many stones are displaced, the whole thing is more complete than can be found elsewhere.

No. 11 in my list, to be destroyed, Koshtemneh, is worthy of especial notice, as it is the remains of a great brick fortress, which, subjected to the action of water, would rapidly be returned to the Nile earth out of which it is made. From the first cataract southward there are several great fortresses, all belonging certainly to a time as far back as the eighteenth dynasty, if not to an earlier period.

At Kortassi, No. 6 in my list, is a great wall of masonry which surrounds the site of a temple, the temple gone within the last few years. Von Prokesch, in his map of the Nile between the first and second cataracts, and made in 1827, shows that part was then standing. This great wall was clearly arranged for purposes of defence. Next we find Koshtemneh, then Kobban, then a great fort at Halfa, another commanding the second cataract at Matouka, and the well-known, but now inaccessible, fort at Senneh, some thirty miles south of the second cataract.

To return to Koshtemneh it was a rectangle of 304 ft. by 252 ft., with walls 12 ft. thick. In one angle on a brick platform are the remains of a temple. Without excavation it would be impossible to assign a date to these remains. I fancy they belong to the nineteenth dynasty. Outside the enclosure can be traced a quantity of buildings in brickwork of ancient Egypt.

The temple at Dakkeh (*see lithograph*) is fairly well known to tourists on the upper Nile, but the great fortress of Kobban is not visited.

Kobban (No. 13 in the list) is a majestic place, a brick-built fortress, standing opposite Dakkeh. Its walls form a rectangle, 354 ft. by 240 ft. They are a solid mass 18 ft. thick, and still stand in parts some 25 ft. above the ground. In common with all the fortified places I have seen on the Nile—whether ancient Egyptian, Ptolemaic, Roman, Coptic, or Arab—there are gates in the walls which lie at right-angles with the Nile. In this case the gateways are flanked with towers, which do not project outward from the wall face, but stand out into the interior, leaving a narrow passage-way 9 ft. wide and 31 ft. long. The most curious feature is a covered way which extends from the south-west corner of the fortress towards the river. This is lined and roofed with big stones, and was covered with a thick skin of crude brick. Within the fortress lie the remains of a temple. Outside the walls are sundry inscribed stones and remains of temples going back to the eighteenth and nineteenth dynasties.

I will not detain you with further descriptions. Each place from Philæ, which I have called No. 1, to the last place, No. 15, the ruined Coptic church, has its interest. I will only say that the reservoir, if made at Philæ, would inevitably reduce all the places described to ruin, and would extend its waters to the Town of Korosko, where the caravan road to Abu Hamed and Khartum takes its start. The rock temples of Beit el Wali, Gerf Husein and Sebua are not included in the list because they are at a level above that of the proposed reservoir when full.

If the reservoir be made with the dam at Kalabshah, the devastation is but an evil moved a little further south. The place selected for the dam lies north of the Temple of Kalabshah. This splendid structure must consequently perish, with all the buildings south of it to Korosko, and whilst we take away seven items from the list at one end we must add at the other, not only several

rock-tombs near Derr of great interest, but more especially the submerging of the plain of Aniba. This is certainly one of the most interesting places in the valley. There stand up in various degrees of perfection pyramidal brick mastabas, things that lower down the river have almost, if not entirely, disappeared. The most perfect of these stands on a stone platform projecting about 6 ft. all round. The mastaba itself is a square of 22 ft. on each side. After rising vertically 4 ft. the pyramidal form begins rising now about 6 ft., but it must, when complete, have been about 12 ft. high, 16 ft. in all. Within is a rectangular chamber covered with a tunnel vault. Painting can still be found on the inside walls of these mastabas—painting that evidently belongs to a very early period. There are great numbers of stone rings and burial mounds, in addition to the sepulchres, of a markedly Egyptian type. This district needs an exhaustive survey and examination.

As the subject of my paper is "The Devastation of Nubia," I cannot leave it without some reference to the proposed reservoirs, in addition to what has already been said.

The engineers have been called upon to scheme a reservoir. They have set to work with a will, and have propounded the most tremendous scheme that has ever been projected.

They evidently think that the monster they have projected needs justification. This is proved by the following extract from the report made upon the subject to the Egyptian Government. On page 7 it is said: "Taking into consideration the magnitude of the reservoir project, we have asked that a commission, composed of three of the most eminent hydraulic engineers in Europe, be appointed for the purpose of considering the several schemes, and advising the Egyptian Government as to which of them should be adopted. We have asked for this commission, not from any want of confidence in ourselves or in our staff, but considering the gigantic nature of the work and the interests involved, we have preferred subordinating our judgment to that of men justly celebrated for their mastery of all subjects connected with hydraulic engineering."

I will quote the report again to show what is said in it about the destruction of Philæ p. 25.

"Unfortunately, with every advantage in its favour as to volume of water stored, soundness of foundation, and economy of construction, this site labours under the objection (which I fear may be found insuperable) of having Philæ Temple on its upstream side. No dam could be constructed on the cataract without inundating a great portion of this Temple for several months every year. I agree with Colonel Ross that no project which had this effect should be admitted unless it were impossible to find a reservoir site elsewhere. We cannot say there are no other possible sites. There are Kalabshah, Philæ,\* and Gebel Silsila which are all available, and we cannot therefore claim that if a dam has to be built, it must necessarily be built at the head of the first cataract and drown the temple of Philæ."

The above two extracts are from the introduction by the engineers' report and are written by Mr. Garstin, C.M.G., for Public Works.

Mr. Garstin goes on to say:—

"If lifting the temple stone by stone, as suggested by Mr. Willcocks, would cause an injury or alteration of any kind to it, I should recommend the abandonment of the Assuan dam altogether. Any work which caused either partial damage to, or the flooding of this beautiful temple, would be rightly considered by the whole civilised world as an act of barbarism."

Mr. Garstin says what he really feels.

I will make one more extract, which will

be from Mr. Willcocks' report. It is very important as showing either the wilful or innocent ignorance of this excellent engineer. He says:—

"The existence of the two temples of Philæ and Abu-Simbel has also been taken account of in all questions connected with reservoirs, and I may state here that in deference to public opinion, which is against the sacrifice of the site of the former temple, I have prepared my designs for reservoirs so as to leave the Philæ Temple entirely free from any possibility of inundation. Abu-Simbel is far out of the reach of any reservoir."

So much for Mr. Willcocks. The majestic structures to which I have called your attention this afternoon, not being known to Cook's tourists generally, are, it would seem, not worthy of regard.

Mr. Hamilton Lang, whose acquaintance with the subject, holding the important position he does in Egypt, is beyond question, has already called attention in the *Times*\* to the unnecessary size of the proposed reservoir.

There is yet another feature of the scheme which I have just mentioned before. One of the greatest importance to the people. England has not only posed as a benefactor to the peasantry, but there is very little doubt that she has assisted the Egyptian people against the oppression of the pashas, landowners, and members of the Khedivial family.

But what, through her engineers, does she now propose to do? To turn out between 25,000 and 30,000 people from their homes and to absolutely efface the very sites on which they were bred and born. Nothing but rocks and Nile mud would be left for a distance of about 100 miles.

This, which is in many ways a more serious matter than destroying history and antiquities, is treated in the most light and airy way in the report. Where the poor people are to go to is not even stated, nor the method of their removal.

I cannot find anything in the reports beyond the statement of certain sums for compensation. For being driven out by the Philæ reservoir, £350,000 compensation. For being driven out by the Kalabshah reservoir £432,000, if the highest level of water be maintained, £240,000 if a lower level be decided upon.

This is not the place to say much on this matter; it is not a question of archaeology, but the work would involve the entire displacement of a considerable tribe, with their own language, customs, &c., and we have also to remember that the botany, the ethnology, in fact everything that gives a country its own character, except the bare bones of the geology, will be effaced, and surely no greater cruelty to a people has been shown since the terrible days of the *corvée*.

Finally, I will give you the replies made to me by a couple of eminent engineers more or less mixed up with this business, when I called attention to the real cruelty to the people. I asked, "Where are the poor folk to go?" By both men I was informed, "Oh, they will go higher up!" "How can that be, the valley from Korosko to Halfa cannot suddenly support more than double its present population?" "No, no, they will go higher up the sides of the valley. If their village is now just above high Nile, then they will have to live 70 ft. or 80 ft. higher up the side above high reservoir level; the Nile will soon deposit earth." Those who know that the people live not a little on their date palms, and that a date palm takes eight years after it is planted to bear fruit, will understand the amount of thought that has been spent on the people of Nubia.

The deposit of Nile earth is a very slow process, and on the steep side of a bare, stony valley no deposit worth talking of will be made for years.

It is especially from the point of view of the poor that the thoughtless cruelty proposed should be combated.

\* *Times*, June 19 and July 10, 1894.

\* Philæ, according to the terminology of the report, means a dam south of the island, as distinguished from that considered best and which is called Assuan, being the reservoir which we commonly call Philæ.



A commission to consider all sides of the subject, not composed merely of three engineers (who, if report speaks true, did not agree very well), but of men with much wider knowledge, is essential, or the credit of England will be grievously imperilled.

S. C.

#### NOTES.

**T**HE second annual meeting of the "Society for Checking the Abuses of Public Advertising" was again held in St. Paul's Chapter House, by permission of the Dean and Chapter. Mr. Waterhouse was in the chair. The meeting was rather better attended than last year, and if all the people of some note who wrote letters to express their regret that they could not attend had come to the meeting instead of writing, it might have been called a very influential one. Mr. Richmond, one of the honorary secretaries, read the report, in which, while admitting that no very great practical result had been achieved as yet by the Society, it was claimed, and we think justly, that the Society had at least made the regulation of advertising a public question; and though the report did not claim that Lord Rosebery's remarks on the subject at the R.A. banquet were the outcome of the agitation of the Society, in our opinion that claim would have been perfectly justified, for we are convinced that but for the public attention drawn to the subject by the Society the Prime Minister's remarks on that occasion would never have been made. Mr. Wyndham, M.P., moved the adoption of the report, in an effective and humorous speech, which would have been better for being a little more condensed, and Mrs. Fawcett seconded it in a rather more serious tone, for her reflection that unless the abuses of advertising were checked we might expect in the end to see pill advertisements on the dome of St. Paul's is scarcely an exaggeration; there are people who we are certain would be delighted to put them there if they could get the chance. It is a creditable incident, and also a testimony that the action of the society has not been without definite results, that one very large advertiser in field placards has intimated that in consequence of the public feeling which has been aroused against this form of advertising he does not intend to renew this class of advertisements after the present contracts have run out. Of course, the practical value of this promise depends on how long the contracts have to run; but the withdrawal of one such advertiser would probably mean the withdrawal of his chief rival, as there is not the same object in spending the money when the competing advertiser withdraws from the field. It appears that the number of members of the Society has increased in a very large proportion since last year; but it is obvious that these members do not take sufficient practical interest in the society, otherwise the numbers attending this annual meeting would have increased in the same proportion. The Society should take itself a little more seriously, and then the press and public will be more likely to take it and its aims seriously. At present they hardly do, and that is one of the principal hindrances to its practical efficiency.

**M**R. R. B. RICHARDSON, of the American School at Athens, sends to the *Berliner-Philologische Wochenschrift* of July 7 a brief report of the excavations carried on this summer at Eretria. Pending the fuller account in the American journal, we may note that in the immediate neighbourhood of the theatre the substructure of a building has been laid bare, which it is conjectured is a temple to Dionysos. Between this building and the west parados of the theatre is a long stylobate with several bases still *in situ*; they evidently served for the exhibition of monuments to commemorate dramatic victories. Fragments of several

inscriptions make this certain. A system of water-courses has also come to light near the theatre, and a portion of an ancient road. At a distance of an hour and a-half to the east of the town a tumulus of somewhat problematic character has been opened; its kernel consisted of a tower 6 metres high. It is uncertain whether it contained a grave or not, as the southern half is much damaged, and it had evidently been opened already. It is quite certain, however, that there was no grave below the tower as the ground has been excavated down to the living rock.

**T**HE Committee of the House of Lords have issued their report on the betterment question and, as was to be expected, they have reported in favour of the principle so far as theory goes. "The principle of betterment," says the report, "... is not in itself unjust." The Committee, however, consider that there must be great difficulty in applying it fairly and satisfactorily, and it is just this practical difficulty which is likely to prevent the principle from coming generally into work. But as was also to be expected, the Committee have also found that if the principle of betterment is just, so also is that of "worsement," and they say "the amount of the injury should be considered in determining the charge to be imposed for improvements." It is obvious, however, that promoters of public works will do little good by raising up and trying to put into practice these two opposing principles, for what they put into the public pocket from one set of owners by means of betterment, will probably be taken from them by other owners for worsement. The committee also recommend that there should be a change in the Standing Orders so as to allow persons whose property may be liable to a betterment rate to have notice of the Bill, as if the property were to be compulsorily purchased. In other words, a host of new opponents of a Bill for obtaining public improvements would be raised up—much, no doubt, to the satisfaction of lawyers and surveyors. Of course, the House of Commons is not bound to apply the principles of the House of Lords Committee to Bills in the lower House, but it is certain that these principles will guide the House of Lords. At the far end of a session this report will have less interest than at the beginning of next year, but, as the result of a careful investigation, it is bound to carry weight.

**A**CCORDING to the current number of the "Transactions of the Manchester Geological Society" (vol. xxii., p. 526) experiments on the bauxite, or alum clay, from the Irish Hill mines, near Ballynure, co. Antrim, have shown that that mineral is capable of making fire-bricks of the most refractory nature, "admirably adapted to withstand prolonged intense heat, and far superior in this respect to the best Stourbridge and Dinas bricks." Such bricks are manufactured in France, which circumstance no doubt influenced the present proposition to establish brick works of a similar nature in Antrim. There can be no question that Irish bauxite, from its composition, is suitable for the purpose named, but we think it rather premature to assume that the product is better, on the average, than that from Worcestershire or Glamorganshire. From its association with psilolitic iron ore and lignite (especially the former), the Antrim alum clay must vary considerably in quality and only a limited portion of it would be available for the manufacture of very high-class fire-bricks. The iron ore passes insensibly into bauxite, there is a gradual diminution in size and number of the pebbles in the ore bed, and they finally disappear as the alum clay is approached. In other words, the bauxite takes the place of psilolitic iron ore in the same bed; it is found in patches of small and sometimes of considerable areas, in various places in the county. Judging from

the published chemical analyses the proportion of peroxide of iron in samples is very variable, ranging from 1.57 to 15.14, and, as this increases, the proportion of alumina becomes less. The quantity of lime, magnesia, potash and soda appears to be tolerably constant, but insignificant. Silica, on the other hand, varies from 8.67 to 10.40; titanic acid is present in large amount, 4.20 to 6.20, whilst combined water forms about one-fourth of the whole. When we compare this with the fire-clays of Stourbridge, Newcastle, Glasgow, &c., the comparatively small quantity of silica in the Irish samples immediately strikes us, for in the English and Scotch clays alluded to, as much as from 50 to 70 per cent. is common enough, the silica thus being far in excess of the alumina. The essential quality desired in refractory products is power to withstand the highest temperatures without melting or combining with the alkaline slags of the metals which are reduced in furnaces constructed with it. Hence, the presence of alkaline material in any quantity more than to form the merest trace of binding on fusion is undesirable. It is necessary that lime and iron be either altogether absent, or present only in very insignificant proportions. With the addition of artificial preparations, the Irish alum clay, especially those varieties which contain but little peroxide of iron, might be made to yield an excellent fire-brick, though whether the material could successfully compete, in a commercial sense, with the Carboniferous clays at present so extensively used in the production of fire-clay goods remains to be seen.

**M**R. EVAN EVANS reports to the Local Government Board as to the cause of an outbreak of diphtheria at Rainham, in the Romford Rural Sanitary District of Essex:—In view of a sustained high death-rate during 1893 from diphtheria in the Hornchurch Sub-District of the Romford Registration District recorded in successive quarterly returns of the Registrar-General, inquiry was ordered by the Board into the circumstances attending the continued prevalence of this disease there. On examining the notification records of the Rural Sanitary District it became evident that the diphtheria in question had been limited for the most part to the village and neighbourhood of Rainham, which seems to labour under a complication of circumstances inimical to health. Shallow wells, from 6 ft. to 12 ft. deep, in the gravel, constituted until recent years the sole water-supply of the village. In 1888 the South Essex Water Company extended their mains into Rainham, but up to the early part of last year very few households had availed themselves of this supply. Even for houses erected within recent years, wells have been sunk within half-a-dozen yards of privy pits and cesspools. At Rainham Ferry the inhabitants are entirely dependent for their supply on rain water and on condensed water from the manufactories. Both these sources of supply occasionally fail, and in the course of last summer water had to be brought from London in tanks for the use of some of the inhabitants. There are no sewers of any description in Rainham; neither are there any road drains for the disposal of surface and storm water. Single dwellings and groups of dwellings are occasionally provided with a pipe-drain discharging into the ditch which has been referred to as bordering the village; in all other cases, the house drainage is into leaky cesspools in the yards or gardens, or else liquid refuse is simply thrown on to the garden or into some minor ditch near the dwelling. The worst feature, however, of house drainage in Rainham is the direct connexion, in many instances, of waste-pipes from sinks with house-drains leading to unventilated cesspools. As yet, but little attention has been given by the Rural Sanitary Authority to either the detection or the rectification of these defects. The Authority do not undertake the removal of the



contents of cesspools. Until recently, excrement was disposed of in privy pits, which were only cleansed irregularly and infrequently; but a considerable improvement has taken place during the last six months by the replacement of some of the privies by galvanized pails, the contents of which are removed weekly by the Sanitary Authority to a farm at a distance from the village. In the older cottages privy pits are generally placed at a sufficient distance from the dwelling, but as regards many of those more recently built, the privy (sometimes the handflushed water-closet) is placed against the scullery, through the walls of which focal matter was found now and again to have percolated. The nuisance and danger arising from such juxtaposition of privy and scullery are considerably enhanced by the heated condition of these sculleries, especially on washing-days, favouring the conveyance into them of closet air.

THE last information as to the Hygienic Congress at Budapest is to the effect that up to July 10, 725 papers have been promised, of which 593 belong to the hygienic and 132 to the demographic group of the congress. Besides this, 26 Governments with 92 delegates, 91 public corporations with 163 delegates, 41 universities with 65 delegates, and 132 learned and other societies with 300 delegates, have notified their intention to be officially represented at the congress; in all, 290 public bodies with 620 delegates. Among these delegations are those from the Government of the United States, the Argentine Republic, the Cape of Good Hope, the State of Michigan, the cities of Burma, Howrah, Rangoon, and Mexico. Delegates will also officially represent Columbia College of New York and the University of Michigan. The Geographical and Statistical Society of Mexico will also send delegates. It is expected that the interest in the congress will be much enhanced by the exhibits of important towns, such as Berlin, Hamburg, Paris, Montpellier, Venice, Odessa, Alexandria, &c., which have promised to send in plans and models of their public sanitation works.

THE case of the London County Council *v.* Humphreys, heard on appeal before Justices Wills and Kennedy, appears for the present at least to decide a point of some importance in regard to the operation of the Metropolitan Building Act in regard to temporary structures. The case was that Messrs. Humphreys had erected a temporary structure called a bungalow without a licence from the London County Council. The defence was that the respondents, who were manufacturers and dealers in structures of wood and corrugated iron, had set up the structure in question outside their premises for exhibition with a view to sale, and that it was not a temporary structure in use. The magistrate had taken this view, and the Appeal Court upheld it, though expressing the opinion that there was some difficulty in drawing a logical distinction. Mr. Justice Wills considered that the question must be answered in each case by considering what was the purpose of the structure and the object of placing it where it was placed. Mr. Justice Kennedy concurred, saying that the Act applied no doubt to temporary buildings, but only to temporary buildings put up for use on the spot. If the Act covered this case, no one could construct a summer-house and expose it for sale without a particular licence from the London County Council in each case, and he could not hold that this could be necessary.

THE case of Waugh *v.* The Corporation of Tynemouth, which has been tried at the current assizes of the North-Eastern Circuit, will be likely to exercise an important effect on sanitary improvements, for the jury awarded 900*l.* damages against this

corporation, as the Urban Sanitary Authority, for negligence in the exercise of their duty, whereby a person lost his life. The negligence in question was the non-connexion of a house drain with a new sewer, whereby the drain became blocked, and caused an accumulation of sewage under the house, which in its turn caused the illness and death of the occupier. Of course, in every case it is necessary to prove clearly the chain of causation, but that this is possible there can be no doubt. When Sanitary Authorities recognise the fact that they are liable to heavy damages for neglect of duty, it is quite certain that improvements in this respect will be much more rapid.

THE *Quarterly Review* includes an article on "English Castles," the title given to a review of Mr. G. T. Clark's great work on the subject; a review written in a very admiring though discriminating spirit. The article closes with a strong protest, in which we entirely sympathise, in regard to the irreverent and neglectful manner in which we treat many of these remains now; though when the writer refers to the example of the French, who "guard them with jealous care," it might be replied that the jealous care of the French has taken the form in some cases of systematic restoration, which is perhaps a worse evil than neglect. The same number of the *Quarterly* contains an article on "Iceland To-day," giving a good deal of information about the country.

A WELL-KNOWN river-side property is placed in the market: Orleans House, Twickenham, originally built by James Johnstone, Secretary of State for Scotland, on the site of a house that the Princess Anne had taken for her son the Duke of Gloucester. He was satirised by Pope:—

"Such Lambeth, envy of each band and gown;  
And Twickenham such, which fairer scenes enrich,  
Grots, statues, urns, and J—n's dog and bitch."

Edward Jesse cleared up this allusion. He asked a friend to examine the two garden walls where the ivy appeared raised, when there was found on one wall a dog, and on the other a bitch, carved in stone. Pope perhaps saw the carvings from his sedan chair in which he used to be rowed on the river. On Johnstone's death the house was bought by G. M. Pitt, whose daughter brought it in marriage to Lord Brownlow Bertie, afterwards fifth Duke of Ancaster. The Duke of Orleans (Louis Philippe) coming from New York in 1800, rented it of Sir George Pococke. Bought in 1846 by Lord Kilmore, it was sold by him to the Duke d'Aumale, who made many alterations in the house, and added a large picture-gallery and a library. On the Duke's return to France it was occupied for a while by Don Carlos of Spain. In 1876-7 the house and grounds were for sale, and, having been purchased by Mr. Cunard, were taken by the Orleans Club, whose effects were dispersed by auction in September, 1883. Here the Duke d'Aumale collected many of his art treasures. The grounds, extending over thirty-three acres, are intersected by a by-road leading from the ferry to the meadows of Marble Hill (also for sale), designed by Lords Burlington and Pembroke for Henrietta Howard, Countess of Suffolk: see our "Notes" of May 5, 1888, and July 12, 1890, and, for a description of Marble Hill Estate, the *Builder* of July 7, 1888. It is said that the octagon room of Orleans House was built for the reception and entertainment of Queen Caroline, by Johnstone.

IN a letter in the *Times* of Thursday the Earl of Wemyss raises an objection to Sir F. Leighton's recent appeal for funds to complete the Wellington Monument in St. Paul's Cathedral, on the ground, not that the work should not be completed, but that the reasoning of the appeal is wrong; that the monument was not "unseen" in its old position; and that in its present position

the addition of the equestrian figure will result in filling up the whole arch, and that Wren hardly contemplated his arcade being filled up in that way; moreover that the symmetry of St. Paul's interior is destroyed thereby, and that a monument of similar dimensions is required in the opposite arch to balance it. We do not think there is very much in this latter argument; but we do think there is some reason, from the architectural point of view, in the objection to crowding up the arch in that manner; at all events it was hardly wise for Sir F. Leighton to have appealed for funds on the ground that the monument is now placed where it "enriches the site." He should have appealed on sculptural grounds for the completion of the monument. And we should like to know what is the authority for Sir F. Leighton's statement that Stevens specially designed the monument for the position in which it now is. We had always believed that he specially designed it to stand in the centre of the nave, and that this was objected to as claiming too prominent a place in the church for it. We do not think it adds to the architectural effect where it now stands, but it is perhaps the best position that could have been found for it to meet all considerations. While, however, it must be admitted that the point raised by the Earl of Wemyss was worth raising, we must observe that he rather stultifies his own judgment by implying that the monument could be properly seen in its former position. Every sculptor in the world, and a good many people who are not sculptors, will tell him the contrary most emphatically.

#### THE CAMBRIAN ARCHEOLOGICAL ASSOCIATION AND THE ROYAL SOCIETY OF ANTIQUARIES OF IRELAND AT CARNARVON.

By invitation of the Cambrian Archaeological Association, fifty members of the Royal Society of Antiquaries of Ireland have visited North Wales to take part in a joint meeting of the two Societies, held at Carnarvon on Monday, July 16, and five following days. The appearance presented by the town of Carnarvon on Monday afternoon, when most of the party arrived, was anything but attractive. Dismantled Venetian masts and triumphal arches reduced to mere timber skeletons lined the route along which Royalty had passed on its way to the National Eisteddfod during the previous week, and everything betokened the inevitable reaction that sets in as the result of unwonted dissipation. On the following morning there was no necessity to call the members early, for a hammering of carpenters engaged in removing the decorations, which would have sufficed for the building of Solomon's Temple twice over, woke every one up at 6 a.m., leaving plenty of time to prepare for the early breakfast at 7.30 on Tuesday.

At 8.30 a.m. the party proceeded by train to Conway, where they arrived at 9.31. The first place visited was the parish church, where Mr. Harold Hughes read an interesting paper on the building, illustrated by a ground plan showing the dates of the various portions. The plan consists of a nave, chancel, and western tower, all in one straight line; a north and south chancel to the nave, separated from it on each side by three bays of pointed arcading, a south transept, vestries at the west end of the north aisle and on the north side of the chancel, and a north and south porch at the west end of the nave. Most of the work is of the Decorated period and of good character, but there are Early English windows in the chancel and the tower. It has been hitherto supposed that after the Cistercian Abbey of Aberconway was removed to a new foundation at Maenan, near Llanrwst, by Edward I., the abbey church was pulled down and the present church built on its site with the old materials in the fourteenth century. Mr. Harold Hughes maintains, however, that as some of the details of the present church are of the thirteenth century, and obviously *in situ*, these must actually have been portions of the Cistercian Abbey Church. The objects most worthy of attention in Conway Church are an elaborately-carved rood-screen—one of the most perfect now remaining in North Wales—and stalls, a good Perpendicular font, and the sepulchral effigy of a lady under an arched niche in the north wall of



the nave. One of the bells, which was probably brought from the Abbey of St. Werburg, at Chester, at the Dissolution, bears the inscription—*AVE . FIDELIS . DIA . WERBURGA . SANTISSIMA . FELIX . IN . CHORO . VIRGINUM.*

Near the south door is a commemorative bust to John Gibson, the sculptor, born near Conway in 1790, who died at Rome in 1868. A curious piece of post-Reformation symbolism occurs on the sepulchral slab of Dorothy Wynn in this chancel (dated 1586), consisting of the common skull and crossbones combined in a very unusual way with six stalks of wheat, and inscribed *MORS FIDELI LVCRVM.*

After leaving the church Mr. Stephen Williams conducted the members over the Castle, which is too well known to be described here. The Irish visitors were as greatly impressed with this splendid memorial of Edward I.'s genius as a military engineer as they were charmed with the natural beauties of the surroundings. Even the architectural nightmares with which the modern builder has been allowed to desecrate this lovely spot cannot entirely spoil the picturesque effect of a town still encircled by its Mediaeval walls, and possessing some at least of its ancient features untouched, such as Plas Mawr and the Church.

A pleasant hour was spent in wandering through the quaint old oak-panelled rooms of Plas Mawr, an Elizabethan mansion, built by Robert Wynne, and now carefully looked after by the Royal Cambrian Academy. Mr. Arthur Baker, the author of the well-known monograph on Plas Mawr, was fortunately present to explain the various points of interest in the building.

In walking through the town two old houses attracted special attention, one at the corner of Castle-street and High-street with an overhanging upper story supported by timber brackets; and another in Castle-street, immediately behind the Church, called the College, which has a curious oriel window sculptured with the three legs of the Isle of Man and the eagle carrying off the infant, the badge of the Stanley family.

After luncheon at the Castle Hotel, the party were conveyed by carriages to Caerhun (pronounced Cairheen), the supposed site of the Roman Conovium. Here Colonel Gough exhibited some Roman flue tiles, coins, &c., found on the spot. A very remarkable leatheren shield with an iron umbo, and ornamented with concentric rows of bronze studs, was also shown. It has been described as being British, but is, in all probability, Scandinavian. It should certainly be sent up to the British Museum, in order to obtain the opinion of an expert as to its probable age.

After returning to Conway the party went by train to Bangor, and drove thence to Penrhyn Castle. Here Lord Penrhyn, the President, welcomed the members and read his address. He said he did not profess to be an archaeologist, and, therefore, he would not waste the time of his audience, or try their patience by talking learnedly upon a subject about which he felt he was less well-informed than they were. He wished, however, to tell them that, although he could not help them to solve archaeological problems, he took a deep interest in his national antiquities, and wished to see them preserved in the localities where they were found, so as to stimulate a just pride amongst the inhabitants in the possession of such things. The Ven. Archdeacon D. R. Thomas and Professor Sayce spoke in reply.

Mr. Thomas Drew, President of the Royal Society of Antiquaries of Ireland, returned thanks to Lord Penrhyn for his hospitable reception of the Irish visitors. After partaking of refreshments, and admiring the beauty of the views from the castle, the members returned to Bangor, and then by train to Carnarvon. The excursion was an unusually long one, but as the weather was fine, and the time well occupied, the day was a most successful and enjoyable one.

**LIFT, GROSVENOR MANSIONS.**—Messrs. Clark, Bunnett, & Co., have recently fitted a new hydraulic passenger lift for Mr. Simmer, at Grosvenor Mansions, Belgrave. In testimony of the satisfaction felt at the work, Mr. Simmer invited all the men who had been engaged upon fixing the lift, and the foremen of the various departments, numbering eighteen, and about forty friends, to a banquet at the Holborn Restaurant, on the 5th.

**SEARCHING FOR A SAXON CHURCH.**—Excavations are being made in the precincts of Peterborough Cathedral, by permission of the Dean and Chapter, with a view to tracing any existing remains of the original Saxon monastery which stood on the site of the present cathedral. A portion of the old Saxon church was discovered under the pavement of the south transept during the restoration of the centre tower of the cathedral.

## Illustrations.

### SCULPTURE FROM THE SALON OF 1894.

**W**E give illustrations of two of the most pleasing works in sculpture that were to be seen this year at the Champs Elysées Salon, the "Musée de la Source," by M. Jean Hugues, and the "Adieux d'une Hironde," by M. Felix Charpentier. The former, which is a work in marble, merits indeed a more decisive epithet than "pleasing," for it may justly claim to be considered one of the finest pieces of ideal sculpture which has been seen at the Salon lately. The figure is a noble one, and there is a grand freedom and harmony of line about it which represents the highest quality of sculpture. The treatment of the accessories is also very decorative, and the straight horizontal lines of the cistern serve to give additional effect to the undulatory line of the figure. The work has recently been purchased by the State.

M. Charpentier's work is a bronze figure, but we have preferred to take the white photograph from the plaster model, as in that from the bronze a good deal of the detail is very indistinct. The figure has the defect inseparable from sculpture representing a figure in flight—it has a very inadequate base constructively, and its weight seems deficient in support; but it is a pretty fancy and a pretty figure.

### REMAINS OF TEMPLES AT PHILÆ, KALABSHAH, AND DAKKEH.

THESE views, reproduced from photographs, are given as illustrations to Mr. Somers Clarke's paper on "The Devastation of Nubia," recently read before the Archaeological Institute, and printed in full in this issue.

### COMPETITION DESIGN FOR ABBEYDALE CHURCH, NEAR SHEFFIELD.

THIS was one of two competition designs selected by the assessor, Mr. Ewan Christian, for the special consideration of the committee; and on architectural grounds we must regret that it was not selected, though we do not know what reasons there may have been apart from this to induce the committee to decline it eventually. The elevation drawing is hung in the Royal Academy, along with some other church designs by the same architect, on the admirable artistic character of which we have already expressed our opinion in reviewing the Academy architectural exhibits.

The church was designed to seat 800, and was to have been built in local stone with green or grey slates for the roofs. The span of the nave is 40 ft. Advantage was taken of the fall of the ground to place the vestries underneath the chancel.

### ASHTON GRAMMAR SCHOOL, DUNSTABLE.

THIS is the drawing exhibited in the Royal Academy, and already referred to in the course of our notes on "Architecture at the Royal Academy."

Mr. Robson has unfortunately been too busy the last few days to comply with our request for some special account of the building; but as the plans, with the names of the various rooms, are very clearly given on the drawing, it pretty nearly explains itself.

### COMPETITIONS.

**SCHOOL BOARD OFFICES, LIVERPOOL.**—On Monday, in the Board-room, Municipal Buildings, Liverpool, a special meeting of the Liverpool School Board was held for the purpose of considering as to the appointment of an architect for the new offices to be erected for the Board in Sir Thomas-street. The chairman, Canon Major Lester, introduced the business, said that the committee had decided to select four Liverpool architects who should be invited to send in competitive plans for the new offices if they were willing to do so. He moved that Messrs. Bradbury, Reader, Deacon, and Kirby be allowed the option of sending in competitive plans. Mr. Oulton seconded. Dr. Sparrow moved that the competition be open to all the architects in Liverpool instead of being limited to four. Mr. Hand seconded, but the amendment was lost by six to seven votes. Mr. Fitzpatrick next moved that the whole of the business be left over till the new Board meet in November. Mr. Watts seconded, but the amendment was lost by a majority of 11 to two votes, and the original proposition was eventually carried.

### ST. CUTHBERT'S, EDINBURGH.

THIS important church, which claims to be the largest parish church in Scotland apart from the whilom "cathedrals," has just been formally reopened after entire reconstruction from designs by Mr. Hippolyte J. Blanc, A.R.S.A. We recently published a view of the eastern end of the new building, which has thus taken the place of the "packing-box" of Sir Walter Scott, the desperately homely barn, without form and void, erected in the last quarter of the eighteenth century, to which a not ungraceful tower and spire were added in 1789. Eleven years ago, this old "West Kirk of Edinburgh," like its predecessor in 1772, was condemned as unsafe, and the new building is now nearing completion, at a cost, it is stated, of over 20,000*l.* The present would seem to be the seventh church that has occupied the site in unbroken succession for twelve centuries, the original church having been erected as a mission station by the patron saint himself, to whom Scotland and Northumbria owe so much. An exceedingly interesting account of these successive churches is given in the *Scotsman* of July 10, which is thus summed up:—

"St. Cuthbert's has not been identified, like St. Giles', with the leading events of Scottish history, but it has a story of its own not wanting in interest. It has seen every phase of Scottish worship—Celtic, Roman, Anglican, Presbyterian. It probably heard the voice of its own patron saint; it was brightened by 'the gracious presence of St. Margaret'; it was canonized by Kirkcaldy of Grange on behalf of Queen Mary; it housed the soldiers of the Protector during the Commonwealth; it was shattered by the guns from the Castle in the rising of 'the 45'; during the present century it has been filled to overflowing at five in the morning, according to the prophetic eloquence of Edward Irving. The new church which has just been erected, being at least the seventh on the same site, is thus the heir of a long history, for St. Cuthbert's is undoubtedly one of the very oldest churches in Scotland, and has been hallowed by the prayers of the faithful for twelve hundred years."

Architecturally, the new church is unfortunately by no means wholly successful, the architect having had to contend against insuperable difficulties in the way of site, available space, and available funds. It is situated at the shallow western end of the valley that divides the new town of Edinburgh from the Castle Rock, just far enough below the level of Prince's-street to feel uncomfortably dark, not nearly far enough below to be dominated and afford that picturesque bird's eye view that lends such charm to many of our ruined abbeys. The result is that the bald skyline of the unbroken roof is mainly visible, and gives the building a heavy appearance, blocking out also from several points too much of the noble view of the Castle without the alleviation of sufficient richness and interest of detail in the foreground. The building is broadly treated and dignified, but has been too much starved in cost to be what it should have been externally for its situation. In place of any central feature, the old tower and spire have been retained at the western end, while any ornamental features of interest have had to be reserved for the eastern end, which has an aspect with flanking towers and rather dwarfed-looking transepts, the architectural effect consequently scattered, especially as the new church is distinctly too large for the old tower and spire, and in itself, owing to the exigencies of the site, too broad for its length. Accommodation had to be found for between two and three thousand seat-holders, all of whom (in a Presbyterian church especially) require to follow the sermon with ease, and therefore hear, as well as see, the preacher. An overpowering gallery was consequently a necessity, and is the principal feature of the interior, extending at the western end over 30 ft. of the floor space. The main body of the church is therefore closely akin to a typical concert-room, and, though treated throughout with breadth and dignity, can hardly give the solemnity of feeling to be looked for in a church for some thousands of worshippers. The eastern end is much more architectural, and is treated in a way that would startle Presbyterians of days gone by. A regular chancel is reached by marble steps, with lectern and pulpit on either side, accommodation for choir, and ample space for a divided organ beneath the eastern tower. In the centre of the apse is the communion table upon a step or *gradus*, in itself a most elaborate work of marble and inlaid stones, not to be distinguished from those altars of old that were so sternly "cast down in bygone days." Saint Cuthbert's would seem to indicate that the sternly orthodox Presbyterians of the older school, whose protests against innovation and ritual are heard from time to time, are not without some "signs of the times" to found upon, while at the same time it indicates doubtless also the steady tendency of modern worship, Presbyterian as well as other, to clothe itself in more ornate and comely outward form.









# JUNIOR SCHOOL DUNSTABLE



FIRST FLOOR PLAN

E. R. ROBSON F.S.A.  
 Architect.  
 PALACE CHAMBERS BRIDGE ST.

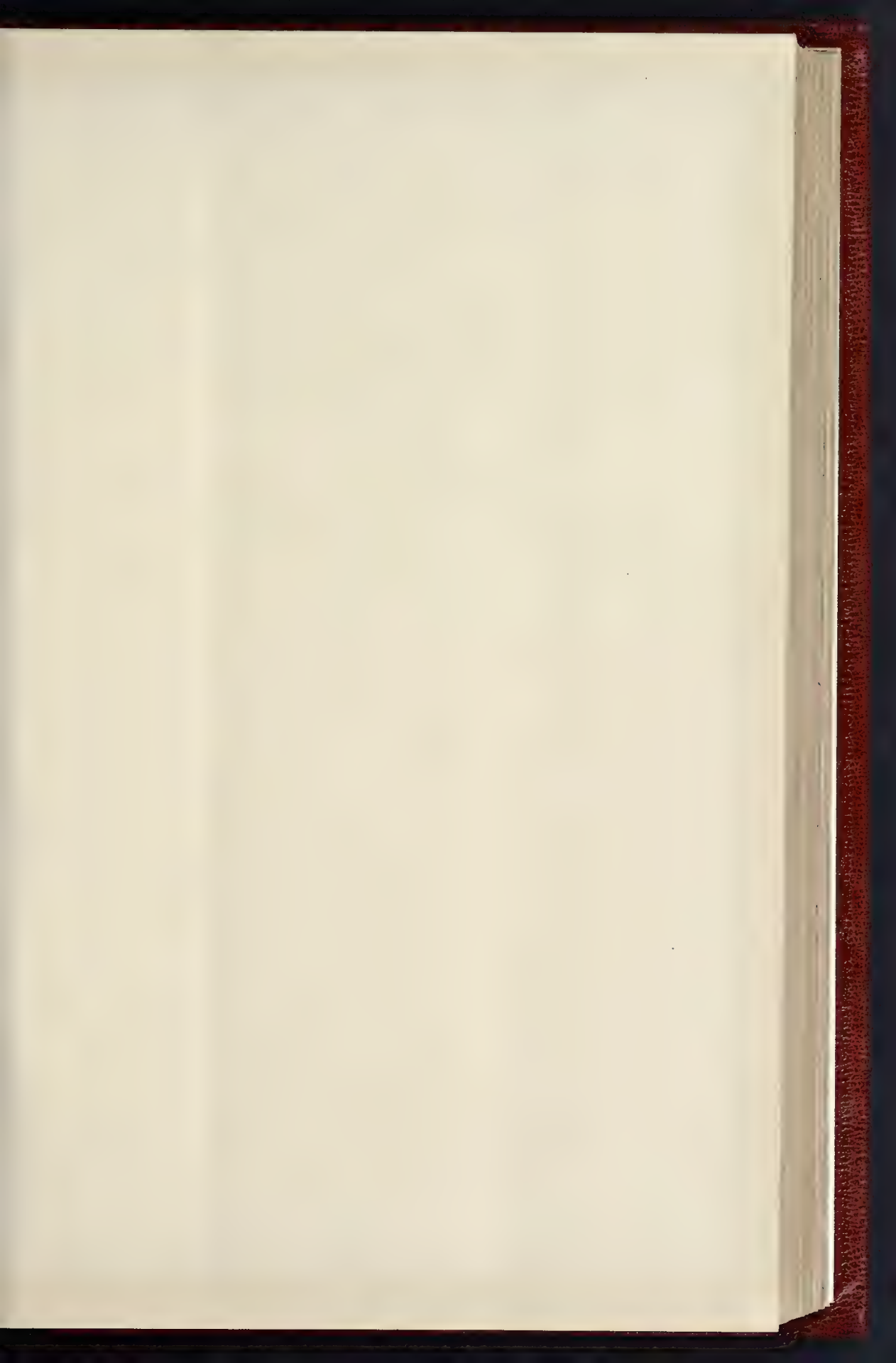
## REFERENCE

- A. Dormitory
- B. Masters Bedrm.
- C. Bath Room
- D. W.C.
- E. H. M. Closet
- F. Staircase
- G. Dormitory
- H. Bath Room
- I. Masters Room
- J. Upper Part of School Hall
- K. Boys Study
- L. Dormitory
- M. Assistant Masters Bedrm.
- N. Dormitory
- O. Bath Room
- P. Master's Study Room
- Q. Bedrm.
- R. Bedrm.
- S. Dressing Room
- T. Staircase
- U. Bath Room
- V. Bedrm.

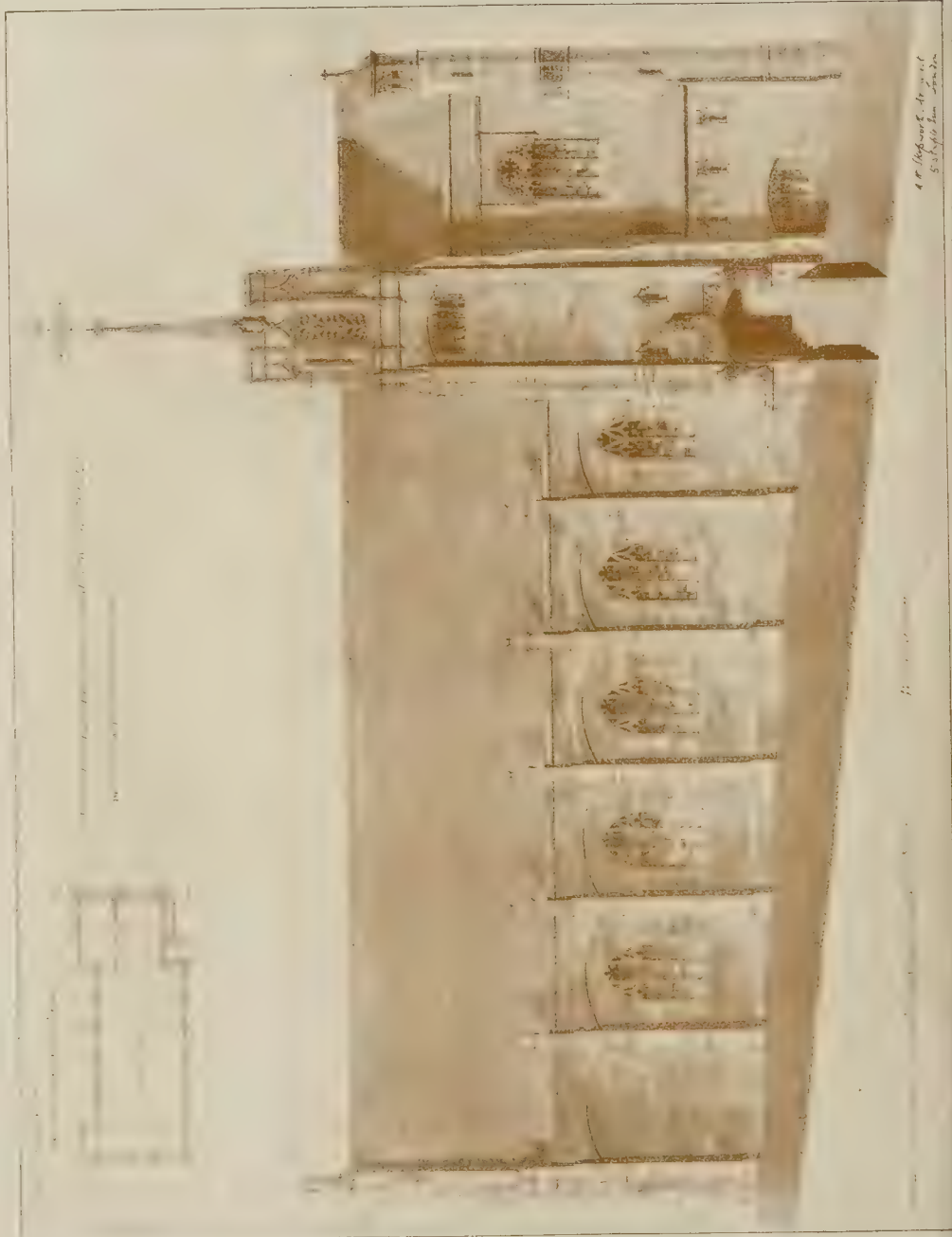






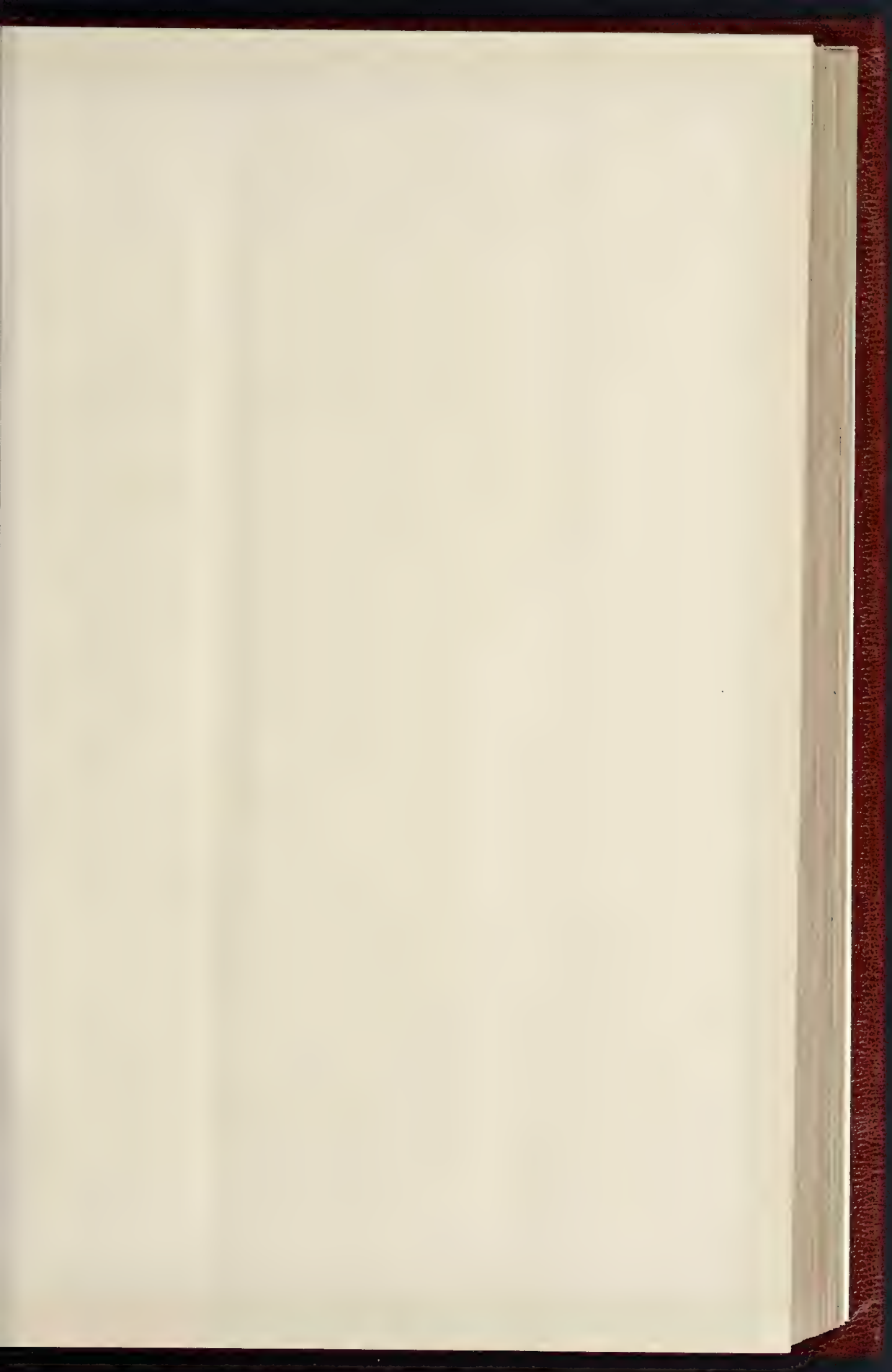


THE BUILDER, JULY 21 1894



4. 11. 1894. St. Paul's  
St. Paul's Church, London







KALABSHAH: INTERIOR OF THE TEMPLE.



TEMPLE AT DAKKEH: FROM THE NORTH-WEST.



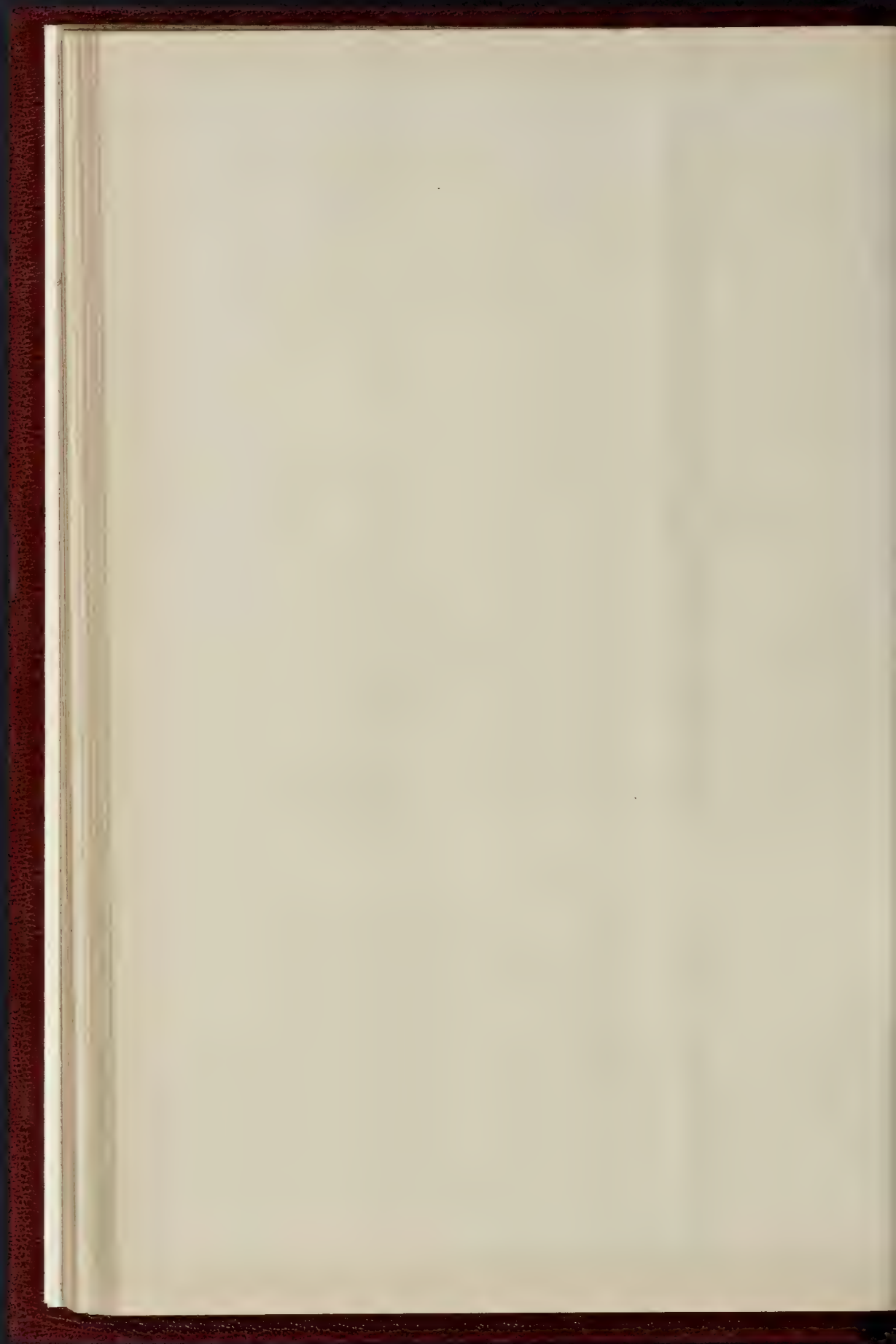




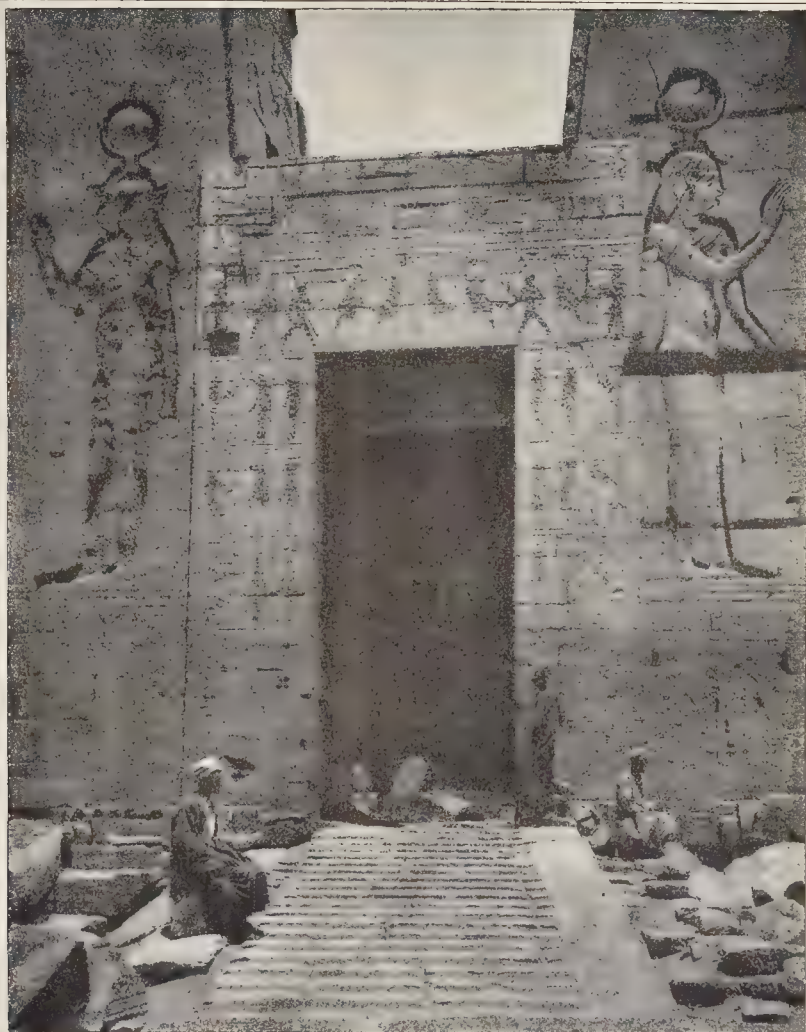




"LES ADIEUX D'UNE HIRONDELLE" M. FELIX CHARPENTIER, SCULPTOR.





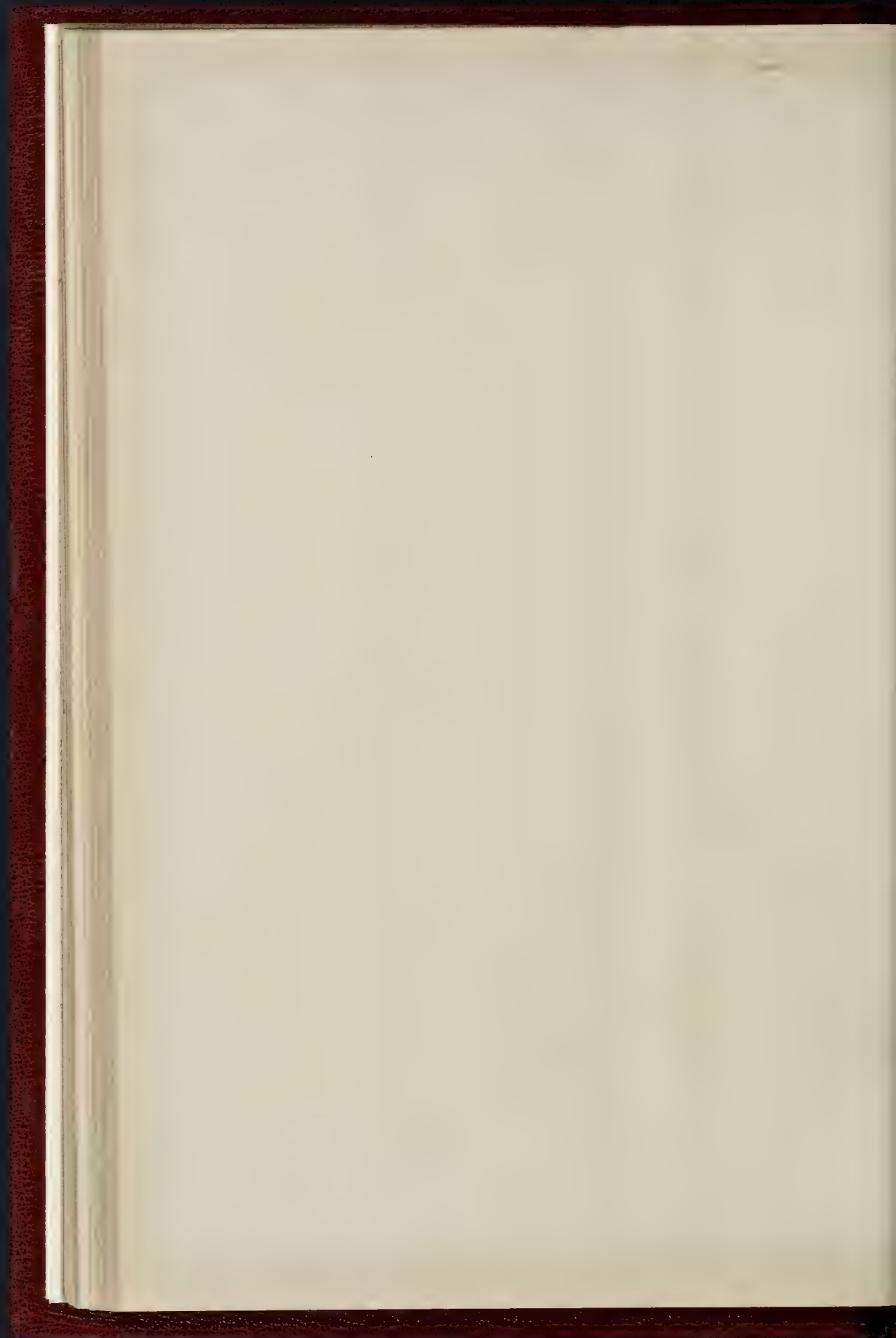


PHILÆ: THE ENTRANCE TO THE TEMPLE.



TEMPLE AT KALABSHAH: FROM THE NORTH-EAST.

NR. PHOTO SPRAGUE & CO. 4 & 5 EAST HARDING STREET FETTER LANE, E.C.



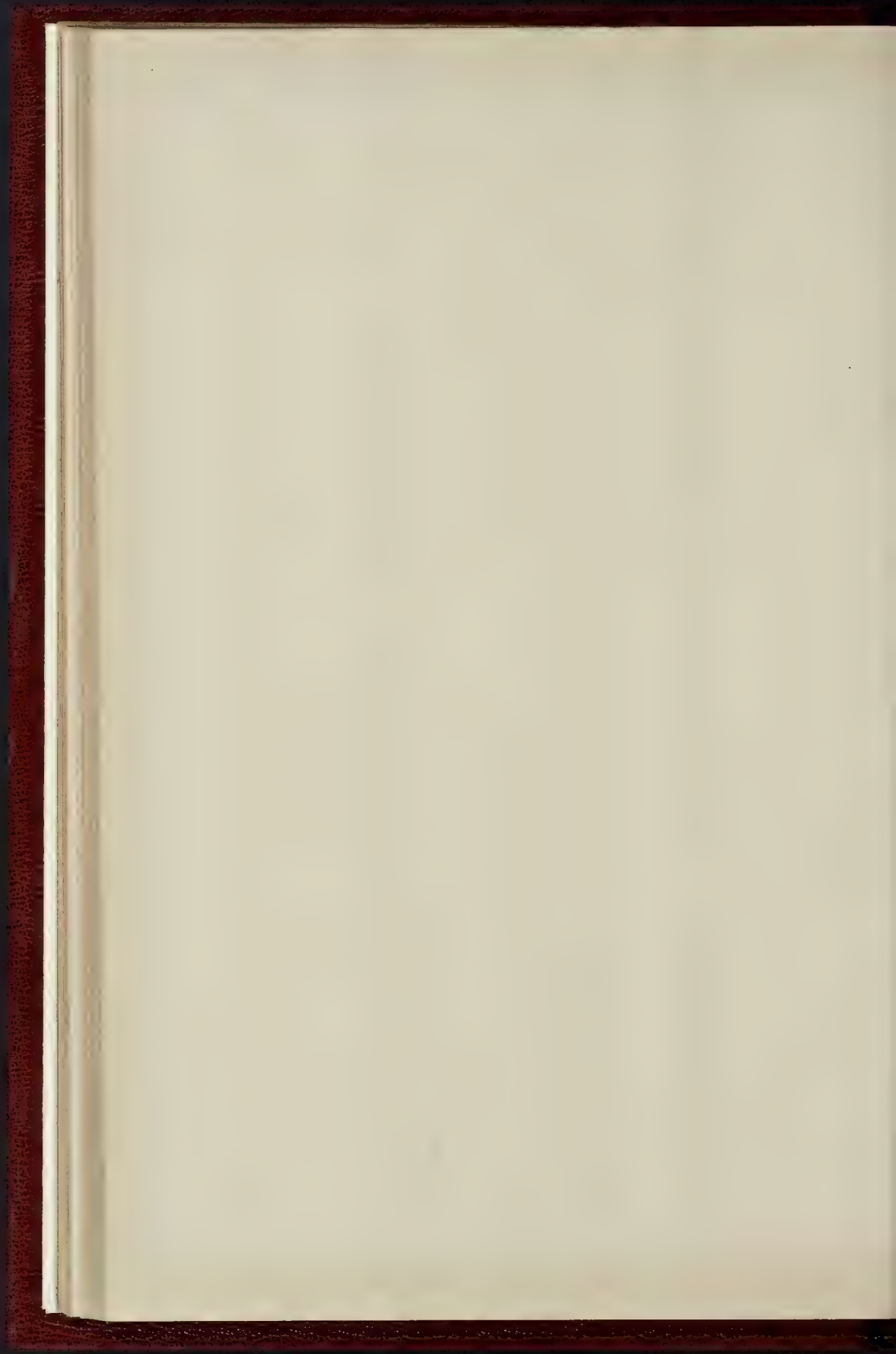


NEW CHURCH FOR ABT. DALL

CHARLES G. DALL

DESIGNED BY THE ARCHT. FIRM







## THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

**Rain-Gauges.**—The Water Committee reported that the engineer was making very satisfactory progress with his investigations as to the site and yield of different sources of water supply and as to the method which might be adopted for storing and conveying water to London. In pursuance of the enquiry it was necessary to have accurate measurements of the average amount of rainfall; and the Committee recommended the Council to sanction the establishment of the requisite number of rain-gauges at an inclusive initial cost of 365*l.*, with 33*ol.*, per annum for maintenance. A motion to refer the matter back having been defeated, the recommendation was adopted.

**Non-Union Labour.**—Mr. Henry Ward, Chairman of the Works Committee, brought up a report from that body in which they referred to a deputation from the National Free Labour Association which had attended the Committee with reference to the allegation that the Works Department had refused employment to non-union men. A statement was made by one of the deputation that only one in seven of the Council's employees was a non-unionist; that statement had since been circulated to members of the Council. When the secretary of the National Free Labour Association was asked how he obtained that figure, he admitted that the Association had no means of making any definite inquiry, and that the figure in question was his estimate. All foremen had been asked if they had any knowledge or information on the matter. The foremen of jobs where about two-thirds of the Council's men were engaged stated they could give no information on the subject, and they had thought it undesirable to press them to make further inquiries into the matter; the other foremen, employing in all 570 men, stated that they had reason to believe that one-third of the number under them were non-unionists. All the foremen had been again instructed that they were not to inquire before engaging a man as to whether he belonged to a union.

Mr. Emden moved that the report be referred back, in order that some further enquiry might be made into the matter. It was stated that one-third of the men employed were non-unionists, but it must be remembered that the great majority of labourers were non-unionists.

Colonel Rotton seconded the amendment.

Mr. John Burns described the reasons of the mover and seconder of the amendment as the finest and most unsubstantial ever urged in favour of the most bogus deputation that ever wasted the time of a public body. He contended that the bulk of the best men in the building trade were in the trade unions.

Mr. Antrobus believed in keeping trade unions in their proper place, and seeing fair play between them and free labour. He had been told that the result of the deputation had been extremely good, as in future both classes of labour would have fair play.

Mr. Emden said he would withdraw the amendment, but the Council refused to allow it.

On the amendment being put to the vote, it was lost by a large majority, and the report was adopted.

**New Sludge Vessel.**—The Main Drainage Committee reported that they had considered the tenders for the erection of a new sludge vessel, and they recommended that the tender of the Naval Construction and Armaments Company, of Barrow-in-Furness, amounting to 23,750*l.*, be accepted.

Mr. M'Dougall (Chairman of the Committees) asked that the Council would allow him to take the matter back, as he had been asked to receive a deputation representing 20,000 workmen in regard to the principle of accepting tenders from firms out of London.

On a show of hands the Council refused to allow the report to go back.

Lieut.-Colonel Ford moved as an amendment that the tender of Messrs. Thompson & Co., of Dundee, be accepted for 23,694*l.*, that being the lowest tender.

Mr. Torrence seconded the amendment, and said it was not fair to invite tenders and then not accept the lowest.

The amendment was lost, and the report was agreed to.

**The Water Supply of London.**—In accordance with notice of motion, Mr. Thornton moved "That the Water Committee be requested to

report to the Council as early as may be on the possibility of procuring an independent and competent supply of water to the metropolis, and the probable cost."

There being no seconder, the motion fell through.

The Council adjourned at seven o'clock.

## Correspondence.

To the Editor of THE BUILDER.

## COMMISSIONS TO ARCHITECTS.

SIR,—My letter to you last week has brought the enclosed from Messrs. Comyn Ching & Co., which, as they appear to desire it, I send you for publication.

Their explanation of the circular I complained of is contained, I suppose, in the parenthesis and postscript. It is a pity the circular was sent out without this explanation, from which we now learn that by discount to architects and surveyors is meant discount to their employers.

If the object is to give the employer the benefit of the discount, I confess that, to my uncommercial mind, it would seem the simpler plan to reduce the price, and let the nominal value be the real one. I think it likely most employers would think so too. Nor can I even now quite see why discount to the public should be described as discount to architects and surveyors. Still, it is satisfactory to be told that, should there be unfortunately such a person as a dishonest architect or surveyor, who battens on illicit commissions, it is the wish of Messrs. Ching & Co. that his employer, and not he, should take the benefit of the discount they allow.

THOMAS G. JACKSON.

"T. G. Jackson, Esq., A.R.A.,  
Eagle House, Wimbledon.  
RE 'COMMISSION' AND COMYN CHING  
& CO.'S VENTILATORS.

SIR,—We regret that you cannot grant us an interview in connexion with your letter published in last week's *Builder*.

We beg to say you are under an entire misapprehension. We thought we could better demonstrate this to you by an interview.

We enclose list of discounts of our ventilators quoted to architects and surveyors (representing their clients) which have at different times been sent out to the profession; also we enclose the slip in question which refers to our *New Patent Silent Mica Valve Ventilator*, patented last year, No. 9,201, which is quite a different article to our ordinary Mica Valve Ventilator, and as the cost of production is greater, we have correspondingly reduced our discount. The list of discounts was printed before this new ventilator was brought out, and you have only to refer to that list, wherein certain ventilators are marked *Nat.*, to see at once that no suggestion of commission is arranged, and that the discount where quoted is what is allowed to the public.

The standard prices of these ventilators were calculated more than twenty years since, and it would be manifestly inconvenient to the trade to alter such. The large demands for them have enabled us to cheapen and improve the manufacture considerably, and consequently to sell to the public at a discount off the gross prices (except in the few instances where mentioned *nat.*), still leaving a fair margin of profit to the contractor. The term "special discount" is distinguished from the discount off the ordinary Mica Valve Ventilator, the gross price being the same.

You will thus see that you have by your comment done us a very serious injury; we trust to your sense of fairness to publicly contradict in this week's issue of the *Builder* the erroneous impression contained in the letter you addressed to the *Builder* last week. Yours respectfully,

COMYN CHING & CO.

P.S.—In dealing with architects, of course we take it they represent their clients."

"\* We have had an interview with Mr. Ching, who has convinced us that Mr. Jackson mistook the intention and meaning of the discount notice; though, at the same time, we must say that Messrs. Comyn Ching & Co. really gave every excuse for the mistake, by their singularly unfortunate way of putting things. Mr. Ching tells us that the form is the same that is sent to tradesmen, only that the discount to the latter is different, and that the statement is only information as to the discount below "list prices" at which a certain article is to be sold. No doubt the trade would understand this, but people who are not in trade are not bound to understand the customs of trade. Mr. Jackson obviously read it as a notice to the effect that if he would specify Messrs. Comyn Ching & Co.'s Mica Flap Ventilator, he should have it at a special discount, to himself, of fifteen per cent. That is the way it naturally reads: that is the way we should have read it. We are convinced now that Messrs. Comyn Ching & Co. had no intention of the kind, and that we and Mr. Jackson have unwittingly done them an injustice. But we should recommend them in future to have a different form of circular for architects, which will not allow of misconception, and not deal the same cards to architects and the trade indis-

criminate. Architecture is not a Trade; though some people, unfortunately, make it so.—Ed.

## COMPETITION FOR THE LLANDUDNO MUNICIPAL BUILDINGS.

SIR,—On behalf of the architects who sent in designs for this proposed new building, may I ask you to insert this letter in your paper.

I suggest that some enquiry be made of the Improvement Commissioners as to what they propose to do in this matter.

The designs were sent in on May 31, and it is not unreasonable of the competitors to expect the accessor to be appointed and to give his award within six weeks of the delivery of the designs.

If report is true, the several packages of designs are still at the offices of the Commissioners untouched, and for the matter of that unthought of.

I think the Commissioners should be reminded of their duty towards the architects who have each spent at least a month or six weeks of valuable time, with their staff, in preparing these designs, which is no small matter.

It is usual for promoters of competitions on receipt of the designs, to advertise in the building papers how many designs have been received in answer to their invitation, but not a word has appeared in any paper, nor is it yet known who has been appointed assessor, which is a most important factor in an important competition.

"A COMPETITOR."

## SCIENCE AND ART EXAMINATIONS.

SIR,—The variance of opinion expressed by your two correspondents "One Who Has Passed" and "First Honours, 1892" supports the statement I made in my last letter respecting the misleading directions given at the last examination in "Honours" Building Construction. The former says that six, or even five, questions fully answered is sufficient for a pass, while the latter states that nothing less than the whole eight will suffice.

I contend that the actual facts of the last examination—namely, that only about 60 out of 700 candidates were admitted to the final, proves conclusively that the statement of "One Who Has Passed" cannot be correct, and that an attempt, at least, at the whole eight questions must have been made a *sine qua non* to a pass.

Again, to say that merely showing a sound knowledge of the subject is sufficient to satisfy the examiners is another rash, unfounded statement, as this is required in the "Advanced" stage, while for the "Honours" nothing less than a minutely complete knowledge will suffice.

If "First Honours, 1892" had taken the trouble to carefully read the letter he attempted to answer he would have seen no complaint from me of the difficulty of the questions. On the contrary, I considered them comparatively easy, and such as would fairly test the general knowledge of the subject.

I should certainly like to see the suggestions of "Another Student" respecting the syllabus adopted, and I feel confident that if this were done, and the directions on the examination paper made more explicit, I should not have the misfortune another year to subscribe myself

"ONE OF THOSE MISLED."

\* \* We cannot publish any more letters on this subject.—Ed.

"Sewer and Drain Ventilation."—Several letters on this subject are held over till next week.

## The Student's Column.

## DETAILS OF RURAL WATER SUPPLY.—III.

## LAND VALUATION, RIPARIAN RIGHTS, EASEMENTS, AND COMPENSATION.

THE persons carrying out a water scheme are technically known as the "undertakers," and may be classified as follows:—

- 1.—Private individuals or companies not possessing Statutory or Parliamentary powers.
  - 2.—Companies who have obtained a Provisional Order under the Gas and Water Facilities Acts, or the fuller powers of a private Act of Parliament.
  - 3.—Local Authorities, Urban or Rural, acting under (a) the Public Health Acts; (b) a Provisional Order; (c) a private Act of Parliament.
- Private individuals or companies not possessing Statutory or Parliamentary powers are placed at a great disadvantage. They are liable to indictment or injunction for breaking up or obstructing the highways; they cannot acquire water or land, except by agreement; they cannot levy rates or make charges, except by agreement; and the only advantage which they can claim is that they "cannot be compelled to furnish a supply of water to anyone on any terms."



It is obvious that, except where a landowner carries out a system of water-supply for the benefit of his property, and where no difficulties arise as regards water-rights, easements, &c., or obstructive highway authorities, further powers are generally necessary.

The simplest and most economical way in which to obtain such powers is to obtain a provisional order under the Gas and Water Facilities Act, 1870, which must afterwards be confirmed by Parliament. A Provisional Order can only be obtained with the consent of the Local Sanitary Authority, and provided that there is not already in existence any legally-empowered water company, able and willing to afford the necessary supply.

A Provisional Order (except in the case of a Local Sanitary Authority) does not confer compulsory powers as to purchase of land or water, or as to entry upon premises. To obtain these powers a special Act of Parliament is necessary.

The powers conferred by a special Act are very comprehensive, and are plainly set forth in the introduction to "The Law Relating to Gas and Water," by Messrs. Michael and Will, as follows:—"Thus authorised by a special Act, a company may take compulsorily lands and streams, subject to the provisions and restrictions of the Lands Clauses Acts in exercising such powers. The undertakers must make to the owners and occupiers of and all other parties interested in any lands or streams taken or used for the purposes of the special Act, or injuriously affected by the construction or maintenance of the works thereby authorised, or otherwise by the execution of the powers thereby conferred, 'full compensation for the value of the lands and streams so taken or used, and for all damage sustained by such owners, occupiers, and other persons by reason of the exercise, as to such lands and streams, of the powers vested in the undertakers.' For the purpose of constructing waterworks, the undertakers may enter upon the lands and places described on the plans and in the books of reference, and may take the levels and set out the parts thereof, and dig and break up the soil, and trench and sough the same, and remove and use earth, stone, mines, minerals, trees, or other things. They may sink wells, make, maintain, alter, or discontinue reservoirs, waterworks, cisterns, tanks, aqueducts, drains, cuts, sluices, pipes, culverts, engines and other works, and erect buildings; they may also divert and impound water from the streams mentioned for that purpose in the special Act or the said plans or books of reference, and alter the course of such streams, not being navigable, and take such waters as may be found in and under or on the lands to be taken for constructing the works. In the exercise of these powers the undertakers are to do 'as little damage as can be.' With respect to the breaking-up of streets for the purpose of laying pipes, the undertakers are empowered to open and break up the soil and pavement of the several streets and bridges within the limits of the special Act, and to open and break up sewers, drains or tunnels within or under the same, and to lay down pipes, conduits, service-pipes, and other works and engines, and from time to time to repair, alter or remove the same."

A Local Sanitary Authority (Urban or Rural) is placed in a somewhat different position to a company. Acting under the Public Health Act, 1875, a Local Sanitary Authority is invested with all the necessary powers for carrying out and afterwards maintaining a water supply scheme, and, in a pecuniary sense, is much better situated than a company, inasmuch as it can compel the whole district to wholly or partially contribute the funds to meet the necessary expenditure, and are not restricted to the actual consumers of the water. Lands or easements necessary for any scheme of water supply must, however, be obtained by agreement; compulsory powers in this respect can only be secured by a provisional order or a special Act. A Local Authority having obtained a provisional order, is, however, powerless, except by agreement, to purchase water-rights—i.e., the right to abstract water from streams, &c., and this difficulty can only be overcome by a special Act of Parliament.

A further difference existing between the powers of a Local Sanitary Authority and those of a company consists in the privilege which the former possesses of purchasing the easement only of laying pipes through land, whilst a land-owner can compel a company to purchase the freehold of the land, except special provision has been made in the private Act.

As the supply of water to communities is in the majority of cases undertaken by the Local Sanitary Authority, the following papers will, unless other-

wise stated, be specially adapted to assist in the preparation and execution of such schemes.

Sec. 308 of the Public Health Act, 1875, enacts as follows:—"Where any person sustains any damage by reason of the exercise of any of the powers of this Act, in relation to any matter as to which he is not himself in default, full compensation shall be made to such person by the Local Authority exercising such powers; and any dispute as to the fact of damage or amount of compensation shall be settled by arbitration in manner provided by this Act, or if the compensation claimed does not exceed the sum of twenty pounds, the same may, at the option of either party, be ascertained by, and recovered before, a court of summary jurisdiction."

Sec. 332 of the same Act further provides that:—"Nothing in this Act shall be construed to authorise any Local Authority to injuriously affect any reservoir, canal, river, or stream, or the feeders thereof, or the supply, quality, or fall of water, contained in any reservoir, canal, river, stream, or in the feeders thereof, in cases where any body of persons or person would, if this Act had not passed, have been entitled by law to prevent or be relieved against the injuriously affecting such reservoir, canal, river, stream, feeders, or such supply, quality, or fall of water, unless the Local Authority first obtains the consent in writing of the body of persons or person so entitled as aforesaid."

These sections taken together indicate the importance attached to the purchase of and compensation for land and water rights, in connexion with nearly every water supply scheme. Unfortunately these matters are not regulated by recognised principles; but the following details, taken from actual experience, will act as a guide in most cases likely to occur in general practice.

In valuing property required for the construction of waterworks, the elements of value and interest to be purchased are numerous, and vary according to the special circumstances of each case. The main points to be considered are:—The value of the special adaptability of the site of agricultural land, garden land, woods and plantations, houses and outbuildings, minerals, severance and injury, removal, trade and other fixtures, loss of trade profits, loss on forced sale.

#### Special Adaptability of the Site.

The "special adaptability" value has been brought into considerable prominence in waterworks cases during the last few years. This element of value was first urged in the case of Sir Walter Riddell and the Newcastle and Gateshead Water Company, and was afterwards an important feature in the case of the Countess Ossalinsky and the Corporation of Manchester, in reference to the Thirlmere scheme. These cases have been relied on as precedents in all the recent arbitrations under the Lands Clauses Act for waterworks purposes.

The valuation is made on the special adaptability of the land for reservoir or other purposes arising from the special and physical conditions of the property. Such value must not be based upon the value to the purchaser, but upon the value to the owner or seller.

In taking into consideration the special adaptability element, it is either taken as the whole value less the agricultural value, or in addition to the latter. In most cases, however, the agricultural value is excluded, and the property solely valued on its adaptability, to which must be added severance and other claims, if any. The value in such cases varies from 3*l.* to 5*l.* per acre, and at from 20 to 25 years' purchase.

In the case of Riddell v. Newcastle and Gateshead Water Company, which went to the Court of Appeal, Lord Bramwell said as follows:—"Special value in special circumstances should be adopted if you are dealing with reservoir sites, just as though you were dealing with building sites; if you are wanting to buy land which is suitable for building purposes you must pay building price for it."

Again, in the case of Ossalinsky v. Corporation of Manchester, the Court held, "if apart from the particular purchaser and the particular Act, land has enhanced value from any special circumstances, the owner is entitled to it." This case did not go to the Court of Appeal, the judgment being adopted by both parties.

#### Agricultural and Garden Land.

Freehold land is usually estimated on the nett annual rental, at from twenty-eight to thirty-five years' purchase, with an addition of 10 per cent. for forced sale.

Leasehold property is valued for the landlord on the rent and reversionary value, the tenants claiming the value of the unexpired term, with an

allowance for forced sale and removal in proportion to the length of term.

The owner of a reversion is entitled to such a sum as would, if accumulated at interest until the date when the property will fall in, amount to the fee-simple value. The valuation is made on a basis of 3 per cent.

#### Woods and Plantations.

These are accurately measured for the acreage, and then arranged under the following heads:—

Full-grown timber. Half-grown timber. Young plantations. Underwood.

Full-grown timber is in most cases measured, owing to the uncertainty of judging their value by the eye, allowance being made for bark and loss in cutting.

Half-grown timber is valued at an average price per acre, based upon the present age of the timber, and the time which will elapse before it will arrive at maturity. This period varies according to the situation, climate, and the nature of the trees.

Young plantations are valued on the outlay in producing them—viz., the plants, planting, fencing, draining, and other matters; the rate of interest depending on the appearance and quality of the trees.

Underwoods are valued in a similar manner to half-grown timber.

The land occupied by the woods and plantations is estimated at the fee-simple value.

#### Houses and Outbuildings.

The value of these is estimated, on the net annual rental, less repairs, at twenty years' purchase, and an additional 10 per cent. for forced sale. Due regard must be paid, in making the valuation, to any prospective increase in the value of the property.

#### Minerals.

Minerals existing under lands to be valued can only be properly estimated when such have been proved either on the land to be valued or on some adjoining property. The valuation is based upon the annual rental at from ten to sixteen years' purchase.

#### Severance and Injury.

When a portion only of a property is required by the undertakers, the remaining portion is frequently diminished in value, or even rendered practically useless, for sheep and stock farming or other purposes, owing to the want of shelter, water, accessibility, &c. These disadvantages must be estimated, and the owner and occupier compensated accordingly.

#### Removal.

This being in most cases a small matter, only a nominal compensation, if any, is allowed.

#### Trade Fixtures.

These are estimated according to the value of the machinery and other works, the horse-power (whether by steam, water, or horse-labour), the capability of the works for production or the ordinary work of the farm, and the state of repair.

#### Loss of Trade Profits.

These are estimated according to the extent and nature of the business, whether the loss will be partial or entail the closing of an established business, and as to whether the occupier is owner, lessee, or tenant.

The value varies from one to six years' purchase of the profits, according to the circumstances.

#### Loss from Forced Sale.

This is, in some cases, considerable, but to per cent. is generally added as compensation for this loss.

### GENERAL BUILDING NEWS.

**PRESBYTERIAN CHURCH, GATESHEAD.**—The Durham-road Presbyterian Church, Gateshead, has just been re-opened after alterations. Messrs. J. G. Green & Co., Gateshead, were the contractors, and the work has been carried out under the direction of Messrs. Marshall & Dick, architects, Newcastle. The work of alterations to seating, and the erection of organ platform, were entrusted to Messrs. Forster & Kirk, Low Fell.

**COWPER-STREET SCHOOLS, LONDON.**—The new wing of the Central Foundation Schools of London, in Cowper-street, opened last week by Sir Henry Roscoe, has been built on what was formerly an open yard, forming an entrance to the playground. The Governors having felt the necessity of having properly-equipped laboratories for the teaching of chemistry and physical science, advantage was taken of this space at the west end of the existing school for the erection of the new additions. The new building is of three stories, with one room on each floor, entered from



the end of the school corridors. The ground floor is for the greater portion left open for light and access to basement and playground, and the main front wall of the building over is carried on columns and arches executed in Portland stone. On this floor is a room suitable to be used as an office. On the first and second floors are placed the physical and chemical laboratories respectively. These are lofty rooms of about 33 feet square, amply lit by large windows on two sides. The main front windows facing due north. The chemical laboratory, on the second floor, has additional light through the open roof from skylights. In erecting the new building the architects had to contend with a source of trouble from the adjoining premises in the shape of vibration, caused by heavy grinding machinery. This was overcome in a large measure by completely isolating the new building on the west side where it adjoins the factory, and by using thick layers of felt in the walls under the floor-boards at various levels. All the fittings of the laboratories have been made from drawings made by the architects, with the advice of Dr. Wormald and the chemistry master, and have been approved of by the Science and Art Department, and are executed in pitch-pine wood with tank-tops throughout. The chemical laboratory is fitted to teach thirty-six boys, and each boy is supplied at his place at the tables with gas and water and a special evaporation niche for small experiments. In addition to these, for the general use of the boys, sink cupboards and a combustion-hood for larger experiments are provided. In the floor of this laboratory are a complete system of drains and flues, taken from all the tables for waste and exhaust purposes, but all are accessible and under control. The fittings in the physical laboratory are of a similar substantial character to suit the requirements of the teaching. These rooms are heated by low-pressure hot water. Ventilation is provided by means of fresh air inlets behind the heating radiators, with extracts from the ceilings of each room to the main extract turret in the roof. The building externally has a frontage to Cowper-street, and is in Suffolk brick and Mansfield stone, with an arcade, on the ground floor, of Portland stone. The building and its fittings have been erected from the designs of Messrs. Thomas & Howard Chatefield Clarke, by Mr. B. E. Nightingale; the cost for building and fittings approaching 3,500l. The London County Council provided a grant towards the cost of the fittings.

**THE GAMBLE INSTITUTE, ST. HELENS.**—On the 15th inst. the plans for the Gamble Institute, St. Helens, were submitted for approval to the Health Committee of the St. Helens Corporation. The Borough Surveyor (Mr. Broom) said the plans were all correct, and they were approved. The plans, which were submitted by Messrs. Briggs & Wolstenholme, architects, of Blackburn, show a three-story building and basement, with a frontage and main entrance to Hardshaw-street. The ground floor will be used as the Free Library portion of the building. The entrance will communicate with a hall, behind which will be the lending department. The whole of the frontage to Bicker-street will be occupied by the news-room, while the opposite wing will be the Reference Library and boys' and girls' reading-rooms. The basement floor will be devoted to the manual training-room, building class-room, metallurgical laboratory, plumbing class-room, and engineering laboratory. The first floor will contain class-rooms, &c., for the various branches of technical education, and the second floor will be devoted entirely to the chemical and arts department. The building will be faced externally with red-pressed bricks and terra-cotta.

**RESTORATION OF LLANGEINOR CHURCH, GLAMORGANSHIRE.**—The fifteenth-century Church of Llangainor, near Bridgend, was reopened a short time since after restoration. The tower had partly fallen, and had to be rebuilt, with stone battlements at top. Modern tracery windows have been placed in the nave and the roof-window restored. An oak roof has replaced the other. The chancel is longer, and a wagon-roof made over the sanctuary, with moulded ribs and carved bosses at intersections. In carrying out this work the ancient priest-door has been recovered and restored. All the old features have been retained—the chancel-arch, the squint-windows on either side, the roof-door over the pulpit, and the holy-water stoop, which was discoloured in the wall. A figure of St. Ceinor, over the south porch entrance has been restored. The floor of the chancel is of encaustic tiles. A stained window has been erected in the east of the church to Miss Olive Talbot. The architect was Mr. George E. Halliday, and the builder, Mr. John W. Rodger, Cardiff.

**RESTORATION OF LLANWONNO CHURCH, GLAMORGANSHIRE.**—The parish church of Llanwonno, near Pontypridd, has just been reopened after restoration. The present work of restoration includes the belfry and a new carved oak roof. During the work of restoration the base of the piscina was found several feet below the ground outside the building, and this has been restored. A portion of a Celtic cross was also discovered. The architect was Mr. Halliday, Diocesan Surveyor of Llandaff. The contractor was Mr. John W. Rodger, builder, Cardiff.

**HYDROPATHIC ESTABLISHMENT, ASKERN, YORKSHIRE.**—On the 14th inst. the Mayor of Huddersfield (Ald. J. J. Brook) opened a new hydro-pathic establishment at Askern Spa. The contractor for the work was Mr. W. Johnson, of Doncaster, and the plans were prepared by Mr. Alderman B. Stocks, of Huddersfield.

**SCHOOL BUILDINGS, OSSETT, YORKSHIRE.**—The memorial stone of additions to the Holy Trinity Schools, Ossett, was laid on the 13th inst. Mr. W. A. Kendal, of Ossett, is the architect, and the works have been let to the following contractors:—Masonry, Mr. Andrew Lockwood; joinery, Mr. R. Stubbs; plumbing, Messrs. Snowden & Son; plastering, Mr. Saunders; slating, Mr. Hemingway, Dewsbury; painting, Mr. A. Lucas.

**BOARD SCHOOLS, BRADFORD AND NEWTON HEATH.**—The memorial-stones of the new Board Schools in Queen-street, Bradford, and Holland-street, Newton Heath, were laid on the 14th inst. The school in Queen-street is a one-story building, with a central assembly hall, on the sides of which are arranged nine class-rooms, providing accommodation for 528 scholars. At either end of the hall are placed the entrances, cloak-rooms, and teachers' rooms. A manual instruction room 36 ft. by 24 ft. is provided at an angle and approached by a separate entrance from the playground. The class-rooms are separated from each other by glazed sliding partitions, and from the central hall by a series of arches filled with glazed screens. The floors are laid with wood blocks. The building is heated and ventilated by hot air. The architect is Mr. H. Lord, and Messrs. R. Neill & Sons are the builders. The school in Holland-street will be entirely surrounded by playgrounds. The building is two-storied and is planned on the central hall principle. It is to be used as a mixed school and an infant school. In the basement there is a manual instruction room 50 ft. by 25 ft. There are eight class-rooms and two teachers' rooms on the ground floor, and nine class-rooms and two teachers' rooms on the first floor. Provision is made for throwing two, three, or four class-rooms into one if necessary. The heating throughout will be by means of open fire-places. The entire cost of the structure, including the site, is estimated at 14,000l. The architects are Messrs. Woodhouse & Willoughby, and Messrs. Neill & Sons are the contractors.

**TRAINING COLLEGE, WATERFORD, IRELAND.**—The training college erected by the Brothers of the Order of De La Salle was opened and consecrated on Monday. The college has been built by Mr. Geo. Nolan, builder, Waterford, from the plans of Mr. Byrne, architect, Dublin, at a cost of nearly 30,000l. The building is built of Bilberry stone, with cement dressings and mouldings. It is 215 ft. long and 60 ft. wide. The college is capable of accommodating over 300 persons.

**TECHNICAL SCHOOL AND FREE LIBRARY, WIDNES.**—The foundation-stone of the new Technical School and Free Library for Widnes, which is being erected on a site adjoining Victoria-square, was laid recently by Mr. T. Sutton Timmis, J.P. The building is being erected by Mr. T. Dilworth, contractor, Wavertree, from the designs and under the superintendence of Messrs. Woodhouse & Willoughby, architects, Manchester. The various rooms of the Public Library will be grouped round the lending library. The news-room will be a one-story building, with open timbered roof, and the boys' room is placed next to the librarian's. The building will have two main entrances, each facing Victoria-road, one for the Public Library, the other for the Technical Schools, the latter having a keeper's house and committee-room adjacent. A separate side entrance and exit will also appear on the west elevation for the readiness of access and despatch to the frequenters of the lending library. The chemical laboratory will stand on the back of the site, and farthest away from Victoria-road. The laboratory will be entered through double doors, will have open and timbered roof, and will be filled with five working tables (double) to accommodate forty students. In conjunction with the laboratory are provided a balance-room, store and reagent room, and bottle-room, together with the lecture-room for demonstrations, etc., fitted with raised gallery, demonstrator's table, etc. With regard to the material used, all exposed internal joinery will be executed in selected pitch-pine, stained and varnished. All corridors, passages, and reading-rooms to be paved with pitch-pine blocks, while the entrance-hall will be laid with ceramic mosaic. The elevations throughout are designed to be faced with Ruabon bricks, with all dressings in red terra-cotta, from Henry Dennis, Ruabon. The estimated cost of the structure is about 10,000l.

#### SANITARY AND ENGINEERING NEWS.

**LECTURES ON SANITATION.**—Mr. H. Gilbert Whyatt, A.M.Inst.C.E., M.S.I., Deputy Borough Engineer, Salford, has received an invitation to deliver a course of twenty evening lectures on "Sanitary Engineering" at Owens College during the coming winter. The lectures form a portion of the whole course in connexion with the certificate of proficiency in Hygiene and Sanitary Knowledge

issued by the Victoria University to Inspectors of Nuisances.

**THE SANITARY INSTITUTE.**—Sir Francis Sharp Powell, Bart., M.P., has consented to act as President of the fourteenth congress of the Sanitary Institute, to be held in Liverpool in September next.

**WATERWORKS, DARTON.**—The laying of the line of mains with service reservoir, required to enable the Darton Local Board to use water obtained from the wall belonging to the Penistone Local Board, is now completed. The distance from the well to the reservoir is between nine and ten miles, and the pressure on the mains equals 425 ft. head. The works are now being used. The two contracts, for iron pipes and general work, amounted to 3,000l. 17s. 6d. and 2,150l. 15s. respectively, or a total of 5,150l. 12s. 6d. The actual cost of the works, after adding extras and making deductions, has been 2,707l. 15s. 1d. and 2,226l. 13s. 6d., or a total of 4,934l. 8s. 7d. The engineer to the scheme is Mr. W. H. Radford, C.E., of Nottingham.

**THE TOTTENHAM AND FOREST GATE RAILWAY.**—This new railway, which brings the Midland Railway system into direct communication with the London, Tilbury, and Southend Company's lines and the mouth of the Thames, has just been opened for passenger traffic. The line commences at South Tottenham by a junction with the Tottenham and Hampstead Junction Railway, and passes through South Tottenham, Walthamstow, Leyton, Leytonstone, and Forest Gate to the junction with the London, Tilbury, and Southend Railway at Wood-grange Park. The length of the line is 6 miles, 4 chains. After leaving Tottenham there are stations at Blackhorse-road, Walthamstow, Leyton, Leytonstone, Wanstead Park, and Woodgrange Park. The contractors were Messrs. Lucas & Aird; Mr. A. C. Pain was the chief engineer, and Mr. J. C. Dickie the engineer-in-charge.

**REDRUTH WATER SUPPLY.**—The Local Government Board have given formal sanction to the loan of 9,500l. for improving the water supply to the town of Redruth. The scheme has been prepared by Mr. H. Bertram Nichols, C.E., of Birmingham, who is also engaged by the Local Board to carry out the work.

#### FOREIGN AND COLONIAL.

**FRANCE.**—The Palais de l'Industrie being comprised within the site for the 1900 exhibition, the Société des Artistes Français intends to memorialise the Government for authorisation to make use of the Pavillon Marsan at the Tuilleries for its annual Salon.—The collection recently presented to the Louvre by M. Grandidier, and which is valued at nearly two million francs, is to be installed on the mezzanine floor, on the side next the Cour du Louvre, and the donor will be appointed curator of the collection.—M. Alfred Boucher, the sculptor, has been commissioned by the Department of Fine Arts to execute a marble bust of the late President, which will be reproduced in Sèvres ware to decorate the official apartments.—MM. Chartran and Polipot, the painters, have commenced a sketch for a grand panorama to illustrate the history of the "Trois Carnots," viz., the late President, his father, and his grandfather Lazare Carnot.—The works sent in by the architectural pupils of the Ecole des Beaux-Arts, in competition for the Prix de Rome, will be exhibited from August 5 to 7. The decision of the jury will be given on August 6. The "Société des Artistes Lithographes Français" has opened a subscription to raise a monument in Paris to the memory of the military artist Charlet.—The "Société des Amis des Arts" of Rheims will open an exhibition from Sept. 29 to Nov. 5. The "Association des Artistes Lorrains" is to organise, at St. Dié, a Fine-Art exhibition, which will be opened in the month of August.—A subscription has been opened for a monumental statue to the late Alphonse de Neuville at Saint Omer, his birth-place.—The works are to be commenced shortly, in the Jura, for a tunnel at Frasses, to take the Mortier-Morez railway.—At the old "Couvent des Oiseaux," now the Mairie of Issy-les-Moulineaux, a ceiling has been discovered decorated with paintings which are believed to be by Fragonard.—The group in bronze by M. Bartholdi, of Washington and Lafayette, is shortly to be placed in the Place des États-Unis at Paris. The work has been presented to the city of Paris by M. Pulitzer, of the *World* newspaper.—At the ancient Roman site now called Timagd, in Algeria, portions have been discovered of a colossal statue which must have been about nine metres in height. It is also reported that traces of colour have been found on the three statues recently discovered in the remains of the Thermæ on the same site.—The death is announced of M. Chas. Arnoul, Government architect at Alençon. M. Arnoul, who was aged 62, had been a pupil of Dommey. From 1852 to 1892 he was architect-in-chief of the department of Orne, and was a member since 1865 of the Société Centrale. He has carried out important works for the Government, notably the "Haras du Pin," the Halle aux Bles at Alençon, the restoration of the churches of Notre Dame and St. Leonard at the same place, numerous other churches and schools, and some remarkable châteaux.—M. Jules Emile Saintin, a



talented painter who had a great success during the last years of the Second Empire, has died at the age of sixty-four. A pupil of Drolling and Picot, Saintin, after having passed several years in America, returned to Paris in 1862 and exhibited a great number of pictures, pastels, and drawings. Among his best works may be mentioned his portraits of M<sup>me</sup>. Carnot, the Princess Mathilde, M<sup>lle</sup>. Reichenberg, M<sup>me</sup>. Madeleine Lemaire, and M<sup>me</sup>. Doche. Among his *genre* pictures may be mentioned "La Soubrette Indiscrette," "Deception," "First Engagement." He received medals in 1866, 1870, and 1880, and the Legion of Honour in 1877.

GERMANY.—The new executive of the 1896 exhibition has nominated a Building Committee, including the well-known architects, Messrs. Grisebach, Bruno Schmitz, and Hoffacker. The *Architecten Verein* has again assumed the executive of its earnest co-operation, and a competition will probably take place for the designs of the galleries. The latter will be somewhat numerous, as a large central exhibition building would cause too much damage to the Treptow Park.—The Berlin Municipality is at last engaged in considering the agreement with Messrs. Siemens & Halske as to the proposed electrical metropolitan elevated railway. According to the terms, the firm, in return for the concession, is to pay the municipality a sum not less than two per cent. of the gross receipts.—The reopening of the Marienkirche is to take place towards the end of August.—The foundations of the monument to the Emperor William will be commenced in the autumn; the various preparatory works are in progress.—It is expected that the Hollenau (or eastern) terminal locks of the North Sea and Baltic canal will be filled for the first time about the middle of next month. The western locks are to be ready a few weeks later, and it is hoped that the canal will be opened for traffic in the autumn of next year.—The city of Leipzig has purchased Professor Herkomer's "Emigrants at Castle Garden," now being exhibited at the Munich Art Exhibition.—Lieutenant v. Sarwey, the military director of the Limes investigation, devotes an article to the results obtained in a recent number of the *IVetendeutsche Zeitschrift*. The remains of palisades, of which frequent mention is made in ancient works, but which had up to the present eluded detection, have been discovered by Messrs. Kohl at Weissenburg-Sand, and by Major Steinhilber, near Ellwangen. They run along at varying distances from the Limes wall. Since the beginning of March, Herr Kohl has traced the Limes from Felchbach to Kaldorf, in Swabia, in the course of which he found the fairly well-preserved remains of eight towers; he is also engaged in the investigation of the Alte Burg, at Weissenburg.—The Emperor has given 8,500*l.* towards alterations at the Church of St. Mary, at Hadersleben.

AUSTRIA.—During the restorations undertaken at the Franciscan Monastery at Pilsen interesting Medieval frescoes dating from the fifteenth century were discovered on the walls of the chapel. This building dates from 1459, and was not included in the almost complete destruction of the monastery during the siege of Pilsen by Mansfeld.—The Government has appointed Professor v. Duhn, of Heidelberg, the German representative on the International Commission which is to direct the proposed archaeological investigations in Herzegovina.

DENMARK.—It has now been decided that the consecration of the Marble Church in Copenhagen shall take place on July 28, the day of the silver wedding of the Crown Prince and Princess, but the interior decorations will not be finished until the autumn. There have just come to light five early designs for the edifice, two by Thura, one by Anthon, and two by Eigtved, apparently some of the competitive designs executed prior to and during the commencement of the church. The church was commenced as far back as 1749 by King Frederick V., in commemoration of the tercentenary of the reign of the House of Oldenburg, but in 1775 the work had to be discontinued from want of funds, having then cost many thousands of pounds. The building remained practically a ruin until 1874, when Herr Tietgen, a wealthy Copenhagen financier, undertook to finish the edifice, although not on the original scale, and with less expensive materials. The work is now completed.—The Danish Crown Architect, Herr Councilor of State Meldahl, has just returned from a visit to Central and South France in order to study Romanesque church architecture, and the Danish Academy of the Fine Arts has voted a sum of 3,000 *kr.* to Herr Thorwald Jorgensen, architect, for studies abroad.—Work on the Glyptothek, or Art Gallery, in Copenhagen is rapidly progressing, and the building will be ready for occupation before the winter. The Gothic church here, and the interior decorations have been commenced.—Two large new buildings have been commenced in Copenhagen, viz.: the new premises of the Magazine du Nord, and adjacent a "warehouse," with offices in English style. They will be provided with all modern improvements. Another large mission is also to be added to "New Copenhagen" in the coal market, from designs by Herr Ingemann, architect; whilst the extensive site of the Løven, a pleasure resort, is to be covered with modern residences. New barracks, too, for the corps of engineers, are being constructed in the Raadmansmark.—The municip-

ality of Copenhagen has decided to build two new public schools at a cost each of 185,000 *kr.* The committee having the question under consideration strongly urged the corporation not to commission the Crown Architect to execute the work, as hitherto has invariably been the case with such buildings, but to offer the work for public competition among private architects.—One of the most important new buildings in Copenhagen is the new head office of the Great Northern Telegraph Company, in the King's New Market. It occupies the entire space between two streets. The building is crowned by an immense figure in bronze of "Electra" by the well-known Norwegian sculptor, Herr Stephan Sinding. The building has originated with Herr Tietgen, founder of the company referred to above. On the first floor the Gresham Life Insurance Company of London have their new head-office for Scandinavia. The new Museum of Arts in Copenhagen is now complete. The style is pure Italian Renaissance, and the cost has been about 385,000 *kr.* The architect is Professor Klein.—An Eiffel Tower, 350 ft. in height, is being constructed in Copenhagen, with a fine view of the Sound and the shipping.—Dr. Polyt. N. P. Nielsen has been appointed Director of the State Laboratory for the testing of cement.—New waterworks are to be constructed in the town of Elsinore, at a cost of 225,000 *kr.*, by Herr Jochimsen, City Engineer.—Of new buildings in the Danish provinces may be mentioned a Mission House in Slagelse, from a design by Herr Thuren, a Copenhagen architect, which has cost 25,000 *kr.*, and a technical school in Stubkjøbing, architect, Herr P. Smith.—Two new technical colleges are to be built in the provinces, and the Rigsdag has also voted funds for continuing the excavations of the ruins of the historical castles of Vordingborg and Hammershus (island of Bornholm). The Ribe Cathedral, the second cathedral in Denmark, is also to be thoroughly restored; likewise the important church of St. Nicolaus, in Svendborg.—The rebuilding of the historical Vallo Castle, burned last year, is rapidly progressing, the strengthening of the great "round" tower is now completed. It was cranked from top to bottom.

NORWAY.—The Government has introduced into the Storting a new building law, somewhat modified from the Bill of last year.—Arrangements are progressing for the holding of an international exhibition in Bergen in 1896 of industries, *handicrafts*, &c., and the site has been selected. The cost is estimated at 400,000 *kr.*, and the deficit at 170,000 *kr.*, to be covered by various societies.—An architect, Herr Heine Jørgensen, of Christiania, has obtained a state grant of 700 *kr.* for the study of church architecture in England, and an engineer, Herr C. W. Tälén, of Christiania, an equal grant for the study of the street paving question.—The Norwegian Society of Engineers and Architects has elected Herr P. Due, the well-known architect, as its president for the ensuing year. It is proposed to add two wings to the Museum of Sculpture in Christiania, the extra space being much required. These wings were originally designed, but had to be abandoned from want of funds. The question now appears to be who is to pay for them, the State or the Municipality.—The erection is now being commenced of a large allegorical pediment group in bronze on the frontage of the church of St. Olaf. The subject is Greek mythology, and the sculptor is Herr Skeiebrok.—It is proposed to raise in the principal square in Christiania, the Eldsvold's Plads, in front of the Storting, a large public fountain at a cost of about 50,000 *kr.*; but as yet only one-half of that amount is at disposal. However, the Municipality will no doubt furnish the other. The chief Norwegian organ, the *Morgenblad*, advocates an international competition for the design.—The Court of the Bank of Norway has practically decided to build new premises in the city of Thordhjem, where is situated the head office of the National Bank. The new building is estimated to cost about 400,000 *kr.*, and certain architects have been invited to send in designs, plans, and estimates for the structure. The *Morgenblad*, however, strongly deprecates a hole-and-corner competition for a semi-national building of such importance, urging an open one.—The new central post office in Bergen has now been completed. There were eighteen designs sent in, the first premium being awarded to a Christiania architect, Herr Peter Dybdal, a student of Berlin, and who commenced the work of construction in 1890. The building is heated by steam and lighted by electricity. The cost is said to be about 250,000 *kr.* A committee has been formed in Bergen for the building of a new national theatre there, to cost about 400,000 *kr.* It is to be modelled on the Lessing Theatre in Berlin. The funds are to be obtained from the public, the spirit monopoly, and the municipality.—A new octagonal church here has just been consecrated in the town. It was designed by Herr Backer, and the cost has been 300,000 *kr.* It is constructed of red bricks and sandstone, with a tower and spire 63 metres in height, and stained windows in all parts.—Since the great fire in Christiansand in July, 1892, when 350 houses, valued at 200,000*l.*, were burned, 178 new brick houses have been raised on the sites, valued at 250,000*l.*, and ten more are in course of construction. New streets and avenues are also being laid out for the embellishment of the town.

SWEDEN.—Plans and designs have now been

prepared for the Great Industrial Exhibition to be held in Stockholm in 1897. The site will probably not be that at suggested, the Djurgård, a fashionable park with pleasure resorts, but more likely that of the present Industrial Palace, with adjacent lands. The Crown Prince is President of the Exhibition Committee, and his brother, Prince Eugen, the talented amateur painter, President of the Art Committee.—Plans, designs, and estimates, too, have been prepared for the Great Scandinavian Industrial Exhibition to be held in Malmö in the summer of 1896.—The Scandinavian Art Society in Rome has received a grant from the Swedish State for the current year of 600 *kr.*

NETHERLANDS.—The Sixth International Biennial "Island Waterway" Congress will be held at the Hague on the 23rd inst. A number of interesting papers are to be read, and numerous excursions have been arranged.—The Brussels International Exhibition has been postponed to 1897, to give more time for the completion of the necessary buildings.

FINLAND.—A committee of the Finnish Diet having had under consideration the "Museum question" for Finland, has prepared a report recommending the erection at Helsingfors of a new museum for the housing of the archaeological, historical, and ethnographical collections of the State. As regards the valuable collection of paintings and sculpture presented by the late Herr Agrell to the nation, the committee recommends that the question should be considered apart, with a view to the erection of a separate museum or gallery for this collection.

#### MISCELLANEOUS.

ST. WERNHURD'S CHURCH, DERBY.—In reference to the condensed description of this building which appeared in our last issue, we are asked to state that Sir Arthur W. Blomfield, A.R.A., & Sons have been the architects from the commencement, and that Mr. A. E. Lofs was the works manager.

WOOD PAVING IN BRISTOL.—On Tuesday Major-General Henry Darley Crozier, R.E., Government Inspector, attended at the Council-house, Bristol, to inquire into an application, on the part of the Bristol Town Council, to the Local Government Board, for permission to borrow 37,500*l.* for works of street improvement. The Town Clerk stated that it was not intended to spend the whole of the 37,500*l.* at once; nor was it proposed to tear up streets laid with other material, which would last some years longer, just to lay them with wood, but to do those streets which needed re-laying with material of some kind.

ESTATES FOR SALE.—Two Hertfordshire estates are offered for sale this month. One is Stagenhoe Park, near Hitchin, which, *temo* Edward III., belonged to the De Verduns, Margaret, daughter and sole heiress of Sir John Verdun, brought it in marriage to the Pilkingtons in the next reign. Sir Thomas Pilkington was the first Lord of Lambert Simnel, and after his death at Stoke, 1487, his large possessions passed to the Crown. Henry VII. gave Stagenhoe to George, Lord Strange, eldest son of Thomas, first Earl of Derby. The manor house built by Sir John Hale, *circa* 1650, was burnt in 1737, and as rebuilt, was lately destroyed. About thirty years ago it was purchased by the Earl of Caithness, and is now held by the executors of his successor. The property covers 640 acres; the rents amount to 500*l.* per annum. The other estate is Totteridge Park, which formerly belonged to the monks, and then to the bishops, of Ely. Bishop Cox alienated it together with Hatfield, to Queen Elizabeth, for a grant of 1,500*l.* a year to him and his successors in that see. Purchased from Lord Bateman by Sir William Lee, Lord Chief Justice, it afterwards belonged to James, Duke of Chandos, and in 1848-9 was the home of Baron Bunsen. In the churchyard is the vault of the Pepys family; there was buried Lord Chancellor Cotton, 1851. Richard Baxter resided many years at Totteridge. The Priory is said to have been occupied by Rachel, Viscountess Russell. Copped Hall, near the church, was the home of Lord Lytton, who altered it in the Italian style.

THE LATE MR. CALDER MARSHALL, R.A.—Mr. C. M. Marshall asks us to make it known that the studio of his father, the late Mr. Calder Marshall, will be thrown open to visitors from Monday the 23rd to Saturday the 28th, on the presentation of visiting cards. The studio contains a large number of the late sculptor's works.

REGISTRATION OF PLUMBERS, AND PUBLIC HEALTH.—Mr. Alderman White, J.P., Chairman of the Norwich Technical Education Committee, presided at a recent public meeting held at the Technical School, Norwich, for the purpose of inaugurating the District Council for Norfolk and Norwich, to legislate in conjunction with the Worshipful Company of Plumbers, London, in carrying out the national registration of duly-qualified plumbers. Mr. W. H. Bishop, Past Master of the Worshipful Company of Plumbers, attended and delivered an address on the principles and objects of registration. Mr. Alderman White said that there could be no doubt that valuable lives had been wasted through bad plumbing, and all citizens would appreciate the movement which went in the direction of good health. He had always felt that the plumbing class was one of the most important and successful sections



of the work carried on at the Norwich Technical School, and he was pleased to say that great success had crowned the efforts of the instructor, and that 75 per cent. of the students had passed the examination recently held by the City and Guilds of London Institute. The following were elected to form the District Council:—Master Plumbers, Messrs. T. C. R. King, G. A. King, W. Bird, J. A. Norman, G. Varsey, F. W. Rogers, A. Stearn, B. W. Johnson, W. Frost, and J. Gooch; Operative Plumbers, Messrs. J. Murrell, R. Simpson, W. J. Clubburn, T. Sayer, A. N. Paul, C. Riches, W. J. Taylor, T. E. Sacker, J. W. Curson, W. Wright; the Public, Dr. W. H. Cooper Patten, Medical Officer of Health, Drs. C. Williams and S. H. Burton, Alderman Ladell (Chairman, Sanitary Committee, Norwich Town Council), Councillor Breese, Alderman Dakin, Councillor Boardman, Mr. S. Cozens-Hardy, Mr. W. J. Allen, and Mr. F. W. Harmer.

**SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.**—On Monday the members of the Sheffield Society of Architects and Surveyors met, on the invitation of the architect, Mr. E. W. Mountford, at the new Town Hall in Surrey-street, Sheffield, and were shown over the building. There was a large number of visitors, who were divided into parties and conducted over the building respectively by Mr. Mountford, Mr. Seales, the clerk of works, and Mr. Robson, the contractor's manager. Mr. C. J. Innocent, hon. secretary, proposed that the thanks of the members present be tendered to Mr. Mountford and his staff for the kind and free manner in which the building had been opened for the inspection of the members. The motion was seconded by Mr. Joseph Smith, a member of the council of the society, who said he had been most interested in the building, and that he very sincerely hoped the City Fathers would, in their wisdom, decide to adopt the few "extras" which, for their effect in the building, would be worth all they might cost. The vote was carried with acclamation, and Mr. Mountford, in responding, said with respect to the items which he had suggested for the internal finishing of the building, it had been stated as a reason for not adopting them that to do so would be unfair to the other architects who competed, but he had heard from Mr. Gibbs and others that such was not the view of the architects of Sheffield, and, indeed, he would have been the last man to have proposed anything that would be unfair to the other competitors. He was glad to have heard the expressions of satisfaction with his work, and he could, at any rate, say of the building that it was thoroughly British, from the steel of the joists to the marble decoration of the walls. When the building was further advanced he would be pleased to invite the society again to look over it, and place himself at their service.

**"EXTRAS" AT THE SHEFFIELD TOWN HALL.**—A meeting of the Sheffield Improvement Committee was held on the 16th inst., when the question of "extras" at the new Town Hall came up for consideration. The committee had previously recommended the Council to pass extras amounting altogether to 7,952*l.*, but the Council, at its last meeting, declined to confirm this increased expenditure, and sent the list back with instructions to reduce it. The committee had before it on Monday a long letter from Mr. Mountford, explaining in detail his views upon the extras, and their importance in view of making the building thoroughly complete, but mentioning several items that might be dispensed with without any serious detriment to the building. Mr. Mountford also attended personally, and discussed the matter with the committee. He decided that Mr. Mountford's letter should be entered on the minutes for presentation to the next Council meeting. A number of the extras were struck from the list, showing a total reduction of 1,526*l.* The committee re-affirmed the advisability of adopting the rest of the items, amounting altogether to 5,406*l.*

**BOILER EXPLOSIONS.**—Mr. James Bryce, M.P., President of the Board of Trade, received a deputation of members of the Manchester Steam Users' Association on the 13th inst., who urged that an independent investigation, such as that held under the Boiler Explosions Act, 1888 and 1890, in the event of every steam boiler explosion, and also in the event of every heating boiler explosion, should be held in the event of every domestic boiler explosion, so that the true cause of such disasters and the best means of preventing them might be ascertained and published. Sir James Ferguson, M.P., introduced the deputation, consisting of Sir Henry Roscoe, Mr. Adam Dugdale (the President), and others. Mr. Bryce, in reply, said that the question was important, because it involved the lives of a large class of persons who were least able to protect themselves—he meant domestic servants. They had no control over the mechanism of the kitchen boilers, and were in every way entitled to any protection the State might give them. He understood that the deputation recommended the use of a safety-valve, and that they trusted to investigations as a safe means of effecting the object they had at heart, and the calling of public attention to the dangers of the boilers, and thereby inducing better care. The Notice of Accidents Bill would shortly pass the House of Lords, and he advised them to move a Member to raise the question of adding a

clause to the measure making its provisions apply to domestic servants. He did not think the matter would pass without a great deal of opposition, and it would be only fair, before expressing any positive opinion on behalf of the Board of Trade, that those who entertained opposite views should be heard; but the matter would continue to engage the very earnest consideration of the Board.

**THE FELLOWSHIP PORTERS' HALL.**—Consequent upon the disbandment of this Fellowship the Court of Rulers have decided to sell the freehold premises in St. Mary-at-Hill, Eastcheap, which have served as the Porters' Hall for more than 100 years past. The building covers 650 ft. superficial, and the hall on the first floor, measures 27½ ft. by 16½ ft. The society had existed from the thirteenth century, and at one time was of considerable importance, numbering 2,500 members at the beginning of this century. The "fellows" had a monopoly of unloading grain on to the riverside wharves, whilst a few enjoyed the further monopoly of compulsory metage, or measurement of corn, which ranked as skilled labour, well paid. But owing to, firstly, the building of the docks, with the discharge of cargoes in the docks, where only the corn-measurers had the right of entry; and, secondly, the passing, in 1872, of the Port of London Grain Act, the porters found their regular employment had gradually left them. The Grain Act abolished compulsory metage on grain, and applied towards the preservation of open spaces around London a fund created by commutating into a fixed assessment the metage payments received by the City Corporation. The Porters' capital stock, of late years greatly diminished, accrued from certain freedom and fellowship fees, and a constant contribution of a penny out of every shilling earned.

**ARCHITECTURAL ASSOCIATION.**—On Saturday last, a party of members, under the guidance of Mr. E. Woodthorpe, repeated the visit to Oxford, made four years ago, of which an account was given in the *Builder*, vol. lix., p. 66.

## LEGAL.

### "BUILDING LINE" DISPUTE AT SUTTON.

In the Chancery Division on the 13th inst., Mr. Swinfen Eady applied on motion to Mr. Justice North in the case of the Sutton Local Board v. Hoare for an *interim* injunction to restrain the defendant, a grocer carrying on business at 121, High-street, Sutton, from rebuilding his premises so as to come beyond the line prescribed by the plaintiff authority under Section 155 of the Public Health Act, 1875. Section 155 provides that where a house is built or the front thereof in a street in an urban district is taken down in order to be rebuilt or altered, the urban authority may prescribe the line in which such house or building, or the front thereof, shall be re-erected.

It appeared that the defendant had pulled down his house, and had sent in plans to the Local Authority for rebuilding on the old line. The Board, however, prescribed a line for rebuilding some 6 ft. behind the old line, and refused to pass the plans unless altered to conform to the prescribed line. The defendant having commenced to put in his foundations the Local Board commenced the present proceedings.

The defence practically was that the plaintiffs were not acting *bona-fide* in the exercise of their powers, because on each side of the defendant's house were comparatively new houses, and the Board had not proceeded to lay down a general line in that part of the street to be carried out by the compulsory powers under Section 154 of the Act. On behalf of the defendant it was argued that it would be futile to put back only one house.

At the conclusion of the arguments his Lordship, in giving judgment, said it was obvious that what the Local Board was doing was with a view to widen the street as opportunity arose, when houses were from time to time rebuilt, and what they were doing was precisely what they were empowered to do by Section 155 of the Public Health Act. It was quite true that they had additional powers under Section 154, but the exercise of that involved their taking the whole of the houses abutting on the side of the street to be set back. In his opinion, requiring the house to be set back some 6 ft. was not at all an unreasonable exercise of the power, and he granted the injunction asked for.

Mr. Swinfen Eady, Q.C., and Mr. Jenkins appeared as counsel for the plaintiffs, and Mr. Samuel Hall, Q.C., and Mr. Bramwell Davis for the defendant.

### WHAT IS A NEW STREET?

In the Queen's Bench Division on Monday last Mr. Justice Mathew had before him the case of the Vestry of St. Matthew, Bethnal Green, v. Button, it being an action brought by the plaintiffs to recover from defendant, Mr. Reuben Button, the owner of adjoining property, 162*l.* alleged to be due from him in respect of the paving of Dagnall-place, E., under the provisions of 18 & 19 Vict., cap. 120, Section 105 & 25 & 26 Vict., cap. 102, Section 112.

The defendant pleaded that Dagnall-place was not a "new street" within the meaning of the latter Act,

and that the Vestry had taken it over by doing work.

Mr. Cock, Q.C., in opening the plaintiff's case said that in 1856 the street was "sewered" by the parish, and that if gas or water companies had occasion to open it up they (the parish) did what was necessary to re-instate the street. Although the street was never paved, a Mr. Munday, the then Surveyor, without any authority, caused some cobblestones to be laid down. The learned counsel contended that although the defendant would rely on this act of Mr. Munday's, it was not evidence that the street had been taken over before August, 1862.

Mr. George Bainbridge, Surveyor to the Vestry from 1856 to 1866, gave evidence for the plaintiffs as to no work being done by the Vestry in Dagnall-place, as it was always considered private property.

Cross-examined by Mr. Jelf, Q.C., the defendant put in a paving channel about 1863 to carry off the water. The Vestry books showed that in 1861 the defendant applied to the Vestry to repair the "defective channel" in the street, and put in lamps. In November, 1862, it was resolved that adjoining owners should pave, &c., all new streets forthwith to the satisfaction of the Vestry, but so far as he knew no application was ever made to the defendant to do so.

A similar resolution was passed in 1866, while in 1864 the defendant made an application to the Vestry to lay down some gravel in the street, which they did.

Evidence on behalf of the plaintiffs having been given by Mr. W. Voss, the son of the Vestry Clerk, and by Mr. Barrett, the present Surveyor to the Vestry, Mr. Jelf, in opening the defendant's case, said that his contention was, first, that Dagnall-place was not a "new street"; and, secondly, that the Vestry were estopped by Mr. Munday's act in 1861 from making any claim now.

The defendant, in his examination-in-chief, said that he had known the place since 1861. It was a thoroughfare until 1862, when it was closed with the Vestry's permission. In 1861 the Vestry paved the channel at their own expense.

In cross-examination he said that the street was levelled at the same time.

Mr. Justice Mathew gave judgment for the defendant, with costs.

Mr. Cock, Q.C., and Mr. Bevan appeared as counsel for the plaintiffs; and Mr. Jelf, Q.C., and Mr. Button for the defendant.

## CAPITAL AND LABOUR.

**PLASTERERS' AND BUILDERS' LABOURERS' STRIKE, NELSON.**—On the 16th inst., building operations were brought to a complete standstill at Nelson, Lancashire, through the strike of plasterers' and builders' labourers and navvies. Certain employers had declined or neglected to sign rules which the workmen had agreed upon.

**STATE OF EMPLOYMENT IN JUNE.**—According to the *Labour Gazette*, no material change has taken place in the condition of the labour market during June, the tendency on the whole being slightly downward rather than otherwise. The labour market has been adversely affected by the prolonged ironmoulders' dispute on the north-east coast, which has considerably disturbed the trade of that district; while the effect of the Scottish coal dispute on other trades has already been appreciable. On the whole, the building trades are scarcely so well employed, and local disputes continue to disturb these trades. The percentage of unemployed members of unions in these trades has risen from 3·3 to 3·5. The changes in wages and hours reported during June are not so numerous as in May, and the numbers affected, with few exceptions, are not large. Many of the increases in wages are in the building trades, the changes affecting the largest numbers being one of a halfpenny per hour, dating from May 26, to about 1,500 bricklayers in Manchester, and one of a farthing per hour, to date from November 1, to about 2,000 builders' labourers in the Potteries. In the building trades twenty-seven disputes occurred during the month, nineteen of which arose in respect of wages and hours of labour, four with regard to local working rules, and the remainder to questions of unionism and individual working arrangements.

## MEETINGS.

WEDNESDAY, JULY 25.

British Institute of Public Health.—Congress in London.

THURSDAY, JULY 26.

British Institute of Public Health.—Congress in London. (Continued.)

FRIDAY, JULY 27.

British Institute of Public Health.—Congress in London. (Continued.)

SATURDAY, JULY 28.

Architectural Association Camera Club.—Visit Eastbury House and Parsloes, Barking.

British Institute of Public Health.—Congress in London. (Continued.)







# The Builder.

VOL. LXVII. No. 268.

JULY, 1894.

## ILLUSTRATIONS.

Competition Designs for Christ's Hospital Schools. By Messrs. Carpenter & Ingelow:—

View outside Gate House .....	Single-Page Photo-Litho.
View of Hall and Class-rooms, and part of Museum and Chapel .....	Single-Page Photo-Litho.
Elevations and Sections of various Buildings.....	Double-Page Ink-Photo.
General Plan .....	Extra Large Photo-Litho.

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### Progress of the Excavations at Delphi.



**DISCOVERIES** at Delphi during the past spring and early summer have followed each other thick and fast. The present seems a favourable moment for presenting a brief summary of the work already done, with a view to clearing the field for the better understanding of the fresh campaign shortly to be begun in the autumn. There is no question that the results so far have exceeded expectations. The precipitous site of Delphi, and the certainty that it had been repeatedly pillaged, led to gloomy forebodings that, save for inscriptions, little of value would be found. But fate has been unusually kind, and that in the matter of sculptures, where least was expected. It is with these sculptures that we propose to begin our *résumé*.

First and foremost, unique indeed among archaic sculpture, stands the frieze from the Treasury House of the Siphnians. The island of Siphnos has sprung into sudden archaeological fame. Pausanias (x., 11, 2) mentions the Treasury, but not the frieze. He tells how the Siphnians had productive gold mines, and how in accordance with an oracle they built the Treasury and offered a tithe of their revenue from the mines to the god; how later they omitted the tribute, and the sea broke in and destroyed the mines. The frieze discovered is of Parian marble, and is in an excellent state of preservation. It is executed with extraordinary minuteness and delicacy; certainly only a wealthy community with gold to spare like the Siphnians could have afforded a work involving such an amazing amount of labour. Dr. Baumeister, in noting his impressions, said that it reminded him of an archaic vase of the finest and most delicate style translated into stone. From his account (*Berliner Philologische Wochenschrift*, 1894, No. 27) we borrow the following details:—On one side is depicted a fight of gods and giants; the giants are represented as usual in black-figure vase paintings as armed men, the gods are in many cases supported by their attributive

animals, which at this early date is somewhat surprising. The centre place is occupied by Kybele, in a chariot drawn by lions; one of the lions has fallen upon a giant and is tearing him to pieces. The shields of the various combatants are seen mostly from the inside, and are sunk in the ground of the frieze; they bear many traces of red colouring; whereas the defensive weapons as well as bridles, trappings, and the like are worked in relief, and so delicately that in many cases they are broken away; some were put in in bronze.

On a second side is represented an assembly of the gods. Ares, armed, is seated at one end, Leto and Artemis are caressing a youth who turns toward them, and who is presumably Apollo. The fragment with Zeus has not yet been found. Athene wears her aegis, which it is interesting from the mythological point of view to know is represented as a skin. She and Dionysos both sit upon splendidly carved seats. The arm of the chair of Dionysos rests on a satyr and a maenad, carved with a minuteness that can only be compared to ivory technique, and which therefore are only partially preserved. From the account of this frieze we may conjecture that the subject is not a mere concave of the gods, but an assembly for the special purpose of receiving Apollo among the Olympians—the scene described in the Homeric legend, and which, according to Dr. Dümmler, appears on the Brygos vase in the Louvre. Such a scene, would of course, be most appropriate at Delphi.

A third series of slabs is in subject less interesting. It represents a Homeric combat over a fallen warrior; the scene is bounded by chariots with charioteers. The last series is less clear in meaning. It represents a scene within a house; female slaves are depicted standing in evident alarm near some *παιῶν*. This is at one end of the composition. It is confidently expected that in the course of the excavations the whole series of slabs will be completed, and we shall then have a monument of very peculiar technique and of great importance *quâ* subject.

The remaining sculptures, to which, from time to time, we have called attention, may be more briefly noted. The metopes of the Treasury of the Athenians are only second in interest to the Siphnian frieze. The building, it will be remembered, is dated

exactly by an inscription stating that it was set up as a votive offering after the battle of Marathon; so that here we have a definite fixed point in the chronology of Greek sculpture—a standard by which to judge and date other monuments. The subjects represented in the metopes are deeds of Herakles and of Theseus and Amazon contests. It is specially fortunate that a monument so securely dated should be decorated with these subjects, which are such frequently recurring types, as it makes comparison the more easy. We again quote Dr. Baumeister as to the style of these metopes. The fetters of archaism are by no means thrown off; in some points the figures resemble the *Ægina* marbles; there is still great difficulty in expressing any but the simplest attitudes. In the Herakles metope, *e.g.*, in which the hero is represented as overcoming the Kerynean stag, he is supposed to be kneeling on the creature, but at the first glance he seems to be lying backwards, somewhat in the attitude of the familiar drunken Faun of Munich: the ancient artist could not make up his mind to completely forego the full-face attitude of the body.

From the great Temple of Apollo so far only one fragment has been discovered, and that is the colossal head of a horse. This probably comes from the Eastern pediment in which was represented Apollo between Leto and Artemis, in the angle the setting sun. In all probability the horse belongs to the sun's chariot. From the western pediment, in which Dionysos and his Thyiades were represented, no fragment has so far been found, or at least identified, but as the excavators are only just now actually coming to the great temple this is not surprising.

It is uncertain to what building a small pediment belongs, made out of one slab. On it is represented that popular Delphic subject, the contest between Herakles and Apollo for the tripod. The style of the design is very stiff and archaic. The building, probably a treasure-house, must have been a very small one. Gathered together in a temporary museum are a number of other more or less fragmentary sculptures, and noticeable among them is the head of the Sphinx dedicated by the Naxians. The colossal body still lies where it was

found on the terrace between the great temple and the polygonal wall. It is a noticeable point in the head that the "archaic smile" still lingers about the corners of the lower lip, whereas the upper lip is quite expressionless. Another colossal statue (of Apollo) with an inscription must be noted in passing. It is by an Argive sculptor, and is of archaic style. From a gigantomachia there remains a very remarkable fragment—the head of a wounded combatant worked in high relief. An arrow has pierced the left eye, and the point protrudes near the right ear. The expression of intense suffering is noticeable, the eye (the face is in profile) is staring wide open, the forehead and upper part of the nose wrinkled in folds, the mouth open and the teeth clenched; the hair stands on end, looking almost like a halo of flame.

We pass next to topographical and architectural discoveries. The modern village of Kastri has, as is well known, been completely removed. It is perhaps not so well known that it has only been moved away about a hundred paces in the direction of the village of Chryso and there solidly rebuilt. The peasants have gained substantially; but there is this archaeological disadvantage, that the western necropolis of ancient Delphi, with its innumerable rock-tombs, has been sacrificed in considerable part to the new modern village. The modern Kastriote has no archaeological compunction, and is not restrained from breaking up these rock-tombs wherever they form a convenient quarry for building stone.

The plan of the excavations has been to begin on the lower ground and work upwards. Several rails have been laid down for trucks to transport away the debris. The work is carried on under the immediate supervision of M. Homolle. There is at present no architect in charge, but there is of course an engineer to supervise the practical operation of the works. The *Wochenschrift* complains of this omission, and states that sufficient attention is not paid to the recording of the exact position in which monuments are discovered. Comparison, much to the disadvantage of Delphi, is drawn with the method of work at Olympia. It is only fair, however, to remember that German criticism of French work is not likely to err on the side of partiality. Moreover, the conditions at Delphi and Olympia are widely different. At Olympia we have a flat plain with no important differences in elevation—an ideal field for excavation. The precipitous position of Delphi makes it a most difficult site for systematic excavation, and, in the case of vases and inscribed stones, obviously already not *in situ*, they often must be moved, and the position where they were found is of comparatively little importance. The French are certainly not, as a school, so strong in matters of topography as the Germans, but with the critical eyes of Europe fixed upon them, it is scarcely likely that any serious oversight will be possible. Moreover, from other sources we learn that an exact register is kept of the precise place where each object is found and the condition of its finding.

Entering the precinct, as Pausanias did, from the east, it is interesting to note that the excavations have in the main confirmed Pomtow's acute conjectures as to the lie and direction of the Sacred Way. The Arcadian inscription mentioned by him is not visible now, but the brazen bull by Theopropos, the monument which Pausanias mentions as standing at the entrance, has yielded its basis with the inscription. Unfortunately, this is one of the instances where a basis is not *in situ*. The bull, it will be remembered, was a votive offering to Poseidon from the Corcyrans. Tradition said that a bull in Corcyra used to leave the rest of the herd and go down to the sea bellowing. As this happened daily, the herdsman went down to the sea to find out the reason, and noticed a shoal of tunny-fish. The people of Corcyra had great difficulty in catching as many of the fish as

they wanted. They sent messengers for instructions to Delphi. The oracle bade them sacrifice the bull to Poseidon, which certainly seemed hard on their benefactor. It was done, however, and the tunny-fish caught. The bronze bull at Delphi represented the tithe of the take. A little further along the sacred way two semi-circular bases, stand, one on either side of the road. On these must have stood some of the many votive statues enumerated at this point by Pausanias. The bases discovered are almost countless; they are far more numerous, more architecturally varied, and some of them larger in size than those found at Olympia. The few that remain *in situ* are of course invaluable as topographical fixed points. The sacred way itself is paved with large slabs of stone, and these are indented with grooves to facilitate the steep ascent. The ascent is straightforward for a little distance, the bases of votive offerings being ranged on either side; but before the first turn of the road and mostly to the left hand lie the foundations of the various treasure-houses. Portions of the walls of these remain to a considerable height. The sacred way continues the ascent to the south of the polygonal wall with the long-known stoa of the Athenians, but a branch road goes to the north-west round the polygonal wall.

Close to this point lies a group of cleft rock left quite unworked on the inner sides. This rock group has an important cultus significance; it is the *πετρα ανωκυρια* *ἡ τῆς γῆς* which Pausanias (x., 12-1) mentions as the place where the Hierophyle in old times chanted her oracles, she who was called the Sibyl; she was the first woman who uttered oracles. The sacred way next turns round the east corner of the polygonal wall to the north, and passes by a large complex of walls, the purport of which is somewhat problematic. It lies to the west of the large temple. Dr. Baumeister conjectures that it may be the great altar—its position fronting the east end of the temple would be appropriate. The sacred way passing this supposed altar on the east side mounts steeply up, and takes a turn necessitated by the great temple. At this point the excavations are now in full progress, and it is, therefore, too early to report on results. Great drums of columns lie about in all directions, and some uncompleted capitals. The ground plan cannot yet be determined with certainty. The railway track line leads, according to the account in the *Wochenschrift*, right across the temple foundation, which seems undesirable.

We may remind our readers that in vol. xiv. of the *Hellenic Journal* Dr. Middleton has a paper on the "Temple of Apollo at Delphi," bringing together all the information possible before the excavations. It will be interesting to note how far his conjectural plan of the temple is borne out by facts. M. Homolle, the Director of the French School, is most hospitable and kind in facilitating the inspection of all antiquities discovered, but, naturally, no photographs, measurements, sketches, &c., are allowed. It is proposed to publish the results as soon as possible after discovery in a special work to appear in instalments. The mass of materials is too great for publication in the ordinary Bulletin of the School. The first issue will be looked for with interest, and we may hope it will contain the remarkable Siphnos frieze.

#### NOTES.



WE print a further letter from Mr. T. G. Jackson on the subject of Messrs. Comyn Ching & Co.'s circular, and that of commissions to architects generally. Mr. Jackson's letter is obviously prompted by the feeling that every honourable man would have, that having unwittingly done Messrs. Ching an injustice (for which, however, their own exceedingly injudicious form of circular was almost entirely to blame), he is anxious to withdraw

the imputation as fully as possible. Further, he seems to imply that the architects are quite as much to blame in the matter as the tradespeople. As to the extent to which this is true we have no means of judging. It is natural to conclude that there must be some architects (or people calling themselves so) who take commissions from tradesmen employed on their buildings, or the offer would not be so frequently made. A day or two after Mr. Jackson's first letter appeared a well-known firm wrote to us saying that they had that day received a letter from the Borough Surveyor of a provincial town stating that he had specified a certain patent of theirs for use in his borough, and expected a commission. But these gentlemen did not offer to print their statement, or to give the name of the offending Surveyor, even privately. But such a statement made to us by a trading firm is quite an exceptional thing. One or two letters we have received from time to time, making charges of this kind against the architectural profession; but they are always anonymous. In the course of each year we usually receive a certain number of letters from architects expressing themselves very indignantly in regard to offers of commissions they have received in tradesmen's circulars. But we can never remember to have received, except in the one case just alluded to, signed letters by virtuous tradesmen expressing their indignation against architects who accept or expect commissions. Therefore we draw our own conclusions. Another correspondent, an architect, writing with the greatest admiration as to the uncompromising tone of Mr. Jackson's first letter, asks why, if Mr. Jackson feels so strongly on the subject, he stands aloof from the Institute of Architects, a body which makes it a special condition of membership that its members should have no pecuniary concern of any kind in building materials or patents? That is, perhaps, a question to be asked, though the answer to it may be a more complicated one than our correspondent would anticipate. We may ask, however, whether the Institute really presses this point as strenuously as it might. We remember a former President of the Institute stating roundly, at one of the meetings, that if the name of any member of the Institute who had accepted trade commissions were brought before him, and the fact proved, he would pledge himself that the name of that member should be struck off the list. Is the Institute prepared at this moment to go to that length?

THE collection of objects excavated by Mr. Flinders Petrie at Kufi, the ancient Koptos, and now on view at University College, is of great interest, especially as some portions of it are supposed to represent an earlier phase of Egyptian art than any remains previously known, though we are inclined to accept with caution some of the very positively worded deductions which have been drawn from this find. If the conclusion is accepted that Koptos was the point of entry into Egypt of the race subsequently known as the Egyptians, and their probable first place of settlement, the remains found there acquire, no doubt, a peculiar interest. The sculptured slabs numbered 2 and 3 are remarkably fine examples of that intaglio relief, as it may be called, peculiar to Egyptian art, in which the surface is sunk around the design, which is in relief in regard to the sunk surface. The execution of these slabs, which have been preserved in a remarkable degree of sharpness in consequence of having been buried face down, is very fine, and (except the usual incorrect treatment of the eye) the action is remarkably energetic and natural for Egyptian sculpture. If the date of this work is really, as Mr. Petrie thinks, anterior to that of any Egyptian sculpture hitherto known, it opens up a new vista in regard to the history of Egyptian art-work, and leaves some of the hitherto known work in the position, not of accomplishment, but of decadence. We cannot help thinking, however, that there is a good deal to be



proved before this position can be confidently accepted. Other exhibits from the same site include sculptured slabs from a temple by Antef V. of the eleventh dynasty; a collection of fragments of very ancient pottery; a number of small objects, ornaments, small vases, cubes of stone gilded (were these for any ornament analogous to mosaic?), and many others. As the result of a few weeks' excavation the exhibition is very encouraging to those who have the ambition to try their luck on unexplored sites. It will remain open from ten to four until the end of August. We may have more to say in reference to it.

THE new nave of St. Saviour's, Southwark, the walls and roofing of which are now completed, was open for inspection to privileged visitors on Saturday afternoon last. The architectural treatment continues in the main that of the ancient choir, with some differences of detail, the most noticeable of which is the employment of marble shafts for the outermost order of the triple vaulting shafts, those in the choir being executed entirely in stone. The interior is completely bare at present, and the floor in a rough state, but the architectural effect of the whole can be judged of, and appears very solid and monumental. The building appears now with almost the proportion and effect of a minor cathedral, internally at all events. It is proposed to remove the monument to "the moral Gower," which at present stands in a niche in the south transept, to the situation which it formerly occupied in the old nave. Another interior alteration which Sir A. Blomfield proposes to carry out is to raise the roof over the crossing, thereby bringing to view a wall arcading which is now hidden, and to cover it with a panelled timber ceiling, using at the intersections of the framing the ancient wooden bosses of the second (wooden) vaulted roof of the nave, which replaced the first vault that fell. These bosses, in very good preservation, are now stored in the retro-choir.

THERE is a widespread feeling in Germany against the threatened submergence of Philæ and the consequent destruction or removal of the architectural remains on the island. The German Royal Academy of Arts has petitioned the German Foreign Office to make a formal appeal to the English Government on the matter.

THE Royal Archaeological Institute, which this year is holding its annual meeting at Shrewsbury, opened its proceedings on Tuesday, the 24th inst., in dull, threatening weather. The Institute was formally received by the Mayor of Shrewsbury, and the President of the meeting, Sir Henry H. Howorth, K.C.I.E., M.P., F.R.S., F.S.A., delivered his presidential address. Over one hundred members and their friends are taking part in the meeting, full particulars of which we shall publish next week.

IT is announced in the *Tablet* that the idea of a competition for the design for the proposed Roman Catholic Cathedral for Westminster has been abandoned, and that Mr. Bentley has been commissioned to prepare a design. We are further informed that the scheme is to provide for a cathedral similar in many respects to the old Basilica of St. Peter's at Rome, and a Benedictine monastery, also a palace for the Cardinal Archbishop and a hall capable of holding two thousand people. All this will be very interesting in an architectural sense, no doubt, if it ever gets carried out.

IT may be asked why reference should so frequently be made to legal decisions in regard to the sanitary state of houses. The answer is that it is only by keeping in prominence the fact that these decisions are increasing in number that it is possible to estimate the force of public opinion on this important subject. Thus the case of Popham v. Davis, which was tried in the Westminster

County Court last week, is noticeable as showing very distinctly the set of public opinion in favour of greater sanitation. It was an action by a landlord for his rent, and in this action the defendant counter-claimed for damages for ill-health caused and expenses incurred in consequence of the insanitary condition of a house, 8, Exhibition-road, Kensington. The jury found by their verdict that the drains were warranted sound, that they were not sound, and that the defendant was induced to take the house in consequence of such warranty; and they gave her 75*l.* damages. The amount claimed for rent was also 75*l.*, so that it is clear that the jury practically set off the damages against the rent. This is somewhat rough-and-ready justice, but it is satisfactory from a public point of view, inasmuch as it shows that a County Court jury is willing to give damages for injury caused by an insanitary house. The class of persons who form such juries is usually the least inclined to set value on good sanitation, so that this case is a hopeful sign of the times.

FROM the report of a recent meeting of the Huddersfield Town Council in the *Huddersfield Examiner* of July 21, we observe that the Council had obtained fifty-six designs in competition for the new Infectious Hospital at Mill Hill, and that an architectural adjudicator (appointed by the Institute of Architects) and a local doctor were to act as joint adjudicators on them. It is to be hoped that the plans will be publicly exhibited, for all professional adjudicators are not infallible in this class of buildings, as we have had occasion to know.

THE question put to the Home Secretary on Tuesday night (24th inst.) in the House of Commons, by Mr. D. Thomas, as to the reorganisation of the Department of Mines at the Home Office, deals with a subject in which quarry-owners take a deep interest, and is not without its bearings from the architect's point of view, as tending to control the supply of building stone. He inquired whether the Government proposed asking for additional statutory powers to enable the Department to collect and publish accurate information with regard to mines and minerals. The Home Secretary replied that, amongst other things, he had appointed three additional inspectors under the Metalliferous Mines Act with a view to the inspection of quarries. Now, this is all very well so far as it goes, and we ought, no doubt, to be thankful for any improvements in the direction indicated. But, judging from the proceedings detailed in the recent report of the "Quarry Committee of Inquiry," the ideas of the Home Office in regard to the nature of a stone quarry are limited, almost entirely, to one in which slate is obtained. No one who knows the slate quarries of North Wales will suggest that the inquiry was unnecessary — by its means a mass of useful information was brought together; but the conditions under which slate is quarried and worked differ widely from those obtaining in stone quarries, though the Committee did not go much into this matter except in reference to certain "road stones" raised in the neighbourhood of Penmaenmawr. If the Home Secretary seriously imagines that three additional persons can adequately inspect all the quarries in the kingdom he is vastly mistaken. As the matter is "still engaging his attention," however, we trust he will further consider this point, though there is little probability of the number of inspectors being materially increased. Whilst engaged on this matter he might also pay some attention to the present loose method of collecting mineral statistics, and to the ridiculous manner of setting out the same in the annual reports. There is, we admit, considerable difficulty in obtaining really reliable statistics in some quarters, as stone merchants not unnaturally resent any enquiry into their

private affairs, especially when they know that the figures will be published. But it is quite possible for the Home Office to obtain and give particulars without publishing too many details, and the Inspectors of Mines might be reminded, in sending in their reports, or the authors of the "mineral statistics" might be informed in collating them, that silver-sand is not "stone" any more than is yellow clay, gravel, shale, chert, calc-spar, and the like, and that these various substances could with advantage be separately dealt with. Further, that the purposes for which a rock is quarried might be specified — if a limestone, for instance, as to whether it is used for burning into lime, or as a building stone, or as road-metal, or as marble, so that in future we may be able to obtain what Mr. Thomas in his question rather satirically dubbed "accurate" information.

IN the construction of scientific instruments of precision it is generally essential to be able to prepare straight-edges of very great accuracy, and those who are engaged with such work will read with pleasure the interesting paper in this month's *Journal of the Franklin Institute*, written by Mr. F. L. O. Wadsworth, in which he describes an optical method recently adopted for such purposes, which has been attended with considerable success. It is possible with the apparatus which he adopts to make straight-edges, at a moderate cost, from 5 ft. to 10 ft. in length, or even longer if desired, so that so that the maximum error does not exceed  $\frac{1}{100000}$  of an inch in their whole length. To arrive at this degree of accuracy by the ordinary method would require an expenditure of time which would cause the work to be impracticable as a commercial undertaking. It is, of course, most important that the material used in the construction of such straight-edges is as homogeneous as possible. The same number of the *Franklin Institute Journal* also contains the first portion of a paper contributed by Mr. Alfred R. Wolff, on "The Heating and Ventilation of large Buildings." By means of a diagram the author shows the co-efficients of transmission of heat per hour for each square foot of different classes of materials composing buildings, due to various differences of internal and external temperature. This diagram is based upon the requirements of the German Government, which are observed in designing heating apparatus for public buildings.

THE last annual report of the Department of Public Works of New South Wales\* gives information as to the nature of the work which has recently occupied the Department. One hundred and twenty-nine miles of railway had been completed during the year under notice, and trial surveys made for a good deal more, which could not be proceeded with at present for want of funds. The improvement and maintenance of harbour works and river navigation, mainly by means of dredging, has occupied a good deal of attention and a considerable amount of work has been done in deepening the channels of rivers. In the Government Architects' branch, the necessity for retrenchment has precluded the accomplishment of much in the way of new buildings, and the architect complains of the inadequate amount granted for maintaining the public buildings of the colony in systematic repair. The only important contract for a new building which was let during the year was for the completion of the Sydney Hospital, from the designs of Mr. John Kirkpatrick, architect, of Sydney. An engraving of this building is appended to the report, but no plan, without which one can hardly judge of it. In the department of roads and bridges a considerable amount of work had been done, at an expenditure of 1,103,000*l.*; three hundred and sixty-six bridges having been built during the year. The most important of these was the bridge

\* The report is for the year 1893, but was ordered to be printed in October, 1893, and has only just reached us.



over the Lachlan, at Cowra, of which some illustrations are appended to the report. In regard to the water conservation and irrigation branch the Chief Engineer points out that the delay in passing an Act dealing with water conservation, irrigation, and drainage is a very serious matter for the colony; and that in the absence of legislation dealing with riparian rights the construction of works for conserving and utilising water cannot be proceeded with. The system of surveys recommended by the Royal Commission on the conservation of water is, however, approaching completion, and the department is now in possession of the information necessary for dealing with the available supplies of water in the western rivers. One gratifying result in regard to water supply has been the unexpected success of a trial artesian boring at Comonable, which was stated by geologists to be beyond the boundary of the cretaceous strata in which artesian borings can usually be applied with success. The experiment, however, has resulted in an ample flow of water, in a locality where, as we gather from the report, it was very much needed.

**ECCLESHALL CASTLE**, near Stone, in Staffordshire, will be shortly offered for sale. Of the old palace of the bishops of the Mercian see, nothing, we believe, remains now except a bridge across the moat, and an ivy-clad tower. In the Conqueror's time the manor belonged to the bishops of Coventry and Lichfield; King John licensed Bishop Geoffrey de Muschamp to lay out a park at Brewood and embattle Eccleshall Castle. In 1310 Bishop Walter de Langton, Lord High Treasurer of England, rebuilt the castle for his principal residence, in addition to those at Heywood, Brewood, Beaudesert, and in London.\* The castle was garrisoned for Charles I., but on its surrender was sacked and made quite uninhabitable. In 1695 Bishop Lloyd rebuilt the south front, and thenceforward the Castle was occupied, until Bishop Lonsdale's death, by his successors, of whom Hough planted the grove and Cornwallis drained the grounds and land around. Bishop Lonsdale (1867) and five of his predecessors were buried in Holy Trinity parish church, restored, as a token of respect for Lonsdale, in 1866-8, by Street, at a cost of between 7,000*l.* and 8,000*l.* The builder was Cobb, of Newport. Soon after the restoration a fire consumed the interior of the north aisle, and part of the nave. On November 7, 1868, we gave a report of an inquiry into the origin of the disaster, attributed to the ignition of a beam that communicated with the flue of the heating apparatus. In the choir south aisle, Lichfield Cathedral, of which he was a great benefactor, and where he began the Lady Chapel, is a recumbent effigy of Langton, who died in 1322. His successor, Roger de Norburgh, *obit* 1359, finished the Lady Chapel, for which Langton had provided the money, rebuilt the Presbytery, and erected the central gable of the west front and the two western steeples. On October 15, 1892, we described the progress that had been made with the cathedral's restoration, upon the report of Mr. Pearson, R.A.

**THE** incumbent of (old) St. Luke's, Chelsea, desires to purchase for 100*l.*, by subscription, the chapel in the north aisle which is named after Thomas Lawrence, goldsmith (*ob.* 1593), and wherein members of that family are buried. He says, in a letter to the *Times*, that the chapel was built, *circa* 1350, by the lord of the manor, and that it is private property, freehold, transferable under purchase or gift. Some years ago a corresponding chapel in the south aisle, built by Sir Thomas More, in 1528, as an appendage of his "pore howse in Chelcith" (since Beaufort House) was bought from the executors of Mr. Crew, for 100*l.*, and trans-

ferred to the church trustees; it is proposed to acquire the north chapel in the same way. Beaufort House, which Henry, Duke of Beaufort purchased from the Earl of Bristol's widow (1682), was bought in 1738 by Sir Hans Sloane, who two years later pulled it down, giving the gateway, designed by Inigo Jones for Lord Cranfield, to Lord Burlington, who took it to Chiswick. Henry VIII., some say, gave the earlier manor house, near the church, to an ancestor of Thomas Lawrence, whose descendant, *temp.* Charles I., restored the More monument, and after whom Lawrence-street is named.

**THE** architectural work in the exhibition, now being held at the South Kensington Museum, of students work for the past year is not of exceptional interest. There are many good drawings, but in many cases the undoubted care that has been spent on them has been thrown away on subjects, and in others a good subject has been spoiled by scratchy execution, or an undue effort to put in shadows, where a simpler treatment would have been more effective. We noticed more particularly among the large number of drawings and sketches: An Elevation of the Rood-screen at Glasgow Cathedral, by Mr. Albert H. Hodge; two elevations in ink-line of the West Fronts, inner and outer, at Bolton Abbey, Yorkshire, by Mr. Wm. Longbottom; a set (poor in execution however) of the Lady Chapel at Lichfield Cathedral, by Mr. Wm. C. Green; the fine screens of wood at Dunster Church, Somerset, by Mr. W. J. Symes; and the Russell Chantry at Lincoln Cathedral by Mr. A. E. Turner. The detail of the pulpit in the old refectory at Beaulieu, Hants, forms a series of drawings by Mr. J. A. Swan, and Mr. A. J. Dunn sends a large quarter full-size pencil drawing of the well-known sedilia at Hawton, Notts, remarkable for the delicacy of its figure-work and foliage. Most of the original designs are very poor, but one of a residence by Mr. A. Hodge, although the general design is very eccentric, has some very clever figure-drawing in one of the sections. The general effect of this is that the drawing has been made to show the capabilities of the designer more as a figure-draughtsman than as an architect. We notice one or two designs also which have been seen before at the Institute in Conduit-street. In the section for studies of historic styles of ornament, Mr. A. J. Dunn sends an interesting half elevation of the reredos in the Lady Chapel at Gloucester, with details of the colour decoration; Mr. H. C. Wallis a set of drawings illustrating the mosaic pavements of the Roman Villa at Bignor, Sussex; and Mr. J. W. Vinnal a sheet of very suggestive drawings of aquatic fauna, showing their decorative capabilities. There are the usual large number of pen-and-ink drawings for menu cards and book-plates, of varying merit, and designs for mosaics, in which the lady competitors easily take the lead (we noticed two examples by Miss Foster and Miss Trower). The exhibition generally may be said to be an average one, although the architectural division does not show any great promise.

**THE** annual address of the chairman of the London County Council is rather a trumpet-blowing document, but we can at least entirely concur with his remarks in regard to the water supply question, to the effect that the report of the Royal Commission is of the most unsatisfactory and conflicting character; that the more one knows of the subject the more difficult it is to agree with the finding of the Commission on many important points; and that "the appropriation of more water from the Thames, instead of affording a permanent settlement of the water question, only postpones the grappling with it for a few years, when every difficulty with which the question is surrounded must be enormously increased." We have already urged this argument in the strongest manner; and perhaps in time the force of it will be a little more generally recognised.

# THE CAMBRIAN ARCHAEOLOGICAL ASSOCIATION AND THE ROYAL SOCIETY OF ANTIQUARIES OF IRELAND AT CARNARVON.

THE second excursion, on Wednesday, July 18, was in a south-westerly direction, along the high-road from Carnarvon to Pwllheli as far as Llanaelhaeri (a distance of fourteen miles), going and returning the same way. The carriages started from the Castle-square, Carnarvon, at 8.30 a.m. On the outward journey a stop was made at Clynog Fawr (ten miles south-west), and on the return journey a deviation from the high-road of a mile-and-a-half to the westward was made, at a point five miles south-west of Carnarvon, to Dinas Dinlle. The ascent to Tre'r Ceiri was effected from Llanaelhaeri.

The weather was cold, with showers at intervals, and the tops of the higher mountains were enveloped in mist throughout the day. Along the whole route beautiful views were obtained of Carnarvon Bay on one side and the mountains lying to the south-west of Snowdon on the other, whilst in front were the three conical peaks of Yr Eifi, more commonly known as *The Rivals*.

The collegiate church of Clynog Fawr is on the west side of the high road, about half-a-mile from the sea-shore, and is well sheltered by trees. The earliest account given of the foundation of a church at Clynog is in the legend of "St. Beuno," published by Bishop Fleetwood in his "Life of St. Winefred," and in translations from the original MS., preserved in the library of Jesus College, Oxford. It is said that when Cadfan, king of North Wales, died, St. Beuno went to visit his son and successor to the throne, Cadwallon, who granted him a place in Arvon, called Gwardog, receiving in exchange a golden sceptre worth sixty cows that had been presented to St. Beuno by Cynan, son of Brochwel.

St. Beuno's title to this land being disputed, Gwyddeint, cousin-german of Cadwallon, gave to God and Beuno, for his soul and for the soul of Cadwallon, the town of Clynog for ever. Clynog Fawr is said to have been founded in A.D. 616. St. Beuno was related to Cattwg and Kentigern. His festival is April 21. In the *Taxation of Pope Nicholas*, A.D. 1291, the clerks then resident at Clynog are termed "Portionists" and therefore formed a collegiate body. In the *Extent of the County of Carnarvon*, made in about the twenty-sixth year of Edward III., it is stated that the will of Clynog is held freely of St. Beuno, though certain payments are admitted as due from it to the prince.

The architectural features of Clynog Fawr church were ably described by Mr. Harold Hughes. The ground plan (see "Archæologia Cambrensis," 1st series, vol. iii., p. 247) is cruciform, with a western tower; a porch on the north side of the nave, and a sacristy on the north side of the chancel. There are no aisles. The extreme outside dimensions are about 150 ft. from east to west, and 75 ft. from north to south. St. Beuno's Chapel is a rectangular building, 50 ft. long by 31 ft. wide outside, standing apart from the church on the south side of the tower, with which it is connected by a covered passage. The axis of the chapel is not parallel to the church, reminding one in this respect of the plan of Cormac's Chapel on the Rock of Cashel, in Ireland. The church, which is the finest in North Wales, is all built in one style (Perpendicular) and St. Beuno's Chapel is also of the same date. The vaulted passage leading from the tower to the chapel deserves a more careful examination than was possible on such a hurried visit. The roof is of stone, and some of the members present were inclined to assign an earlier date to it than to the rest of the building. In the church are preserved three objects of exceptional interest—(1) St. Beuno's Chest, hollowed out of a solid log of oak, and having a lid secured by three locks; (2) a pair of iron dog-tongs, dated 1815, used for forcibly ejecting unruly canine worshippers from church; and (3) a mazer\* bowl of wood with a silver mounting inscribed—

"TU NAZARENUS REX JUDEORUM ILLI DEI—  
MISERERE MEI."

It was formerly a custom in the parish to bring to the church as an offering calves and lambs born on Trinity Sunday (the anniversary of St. Beuno) with a natural mark on the ear, known as "Nod Beuno," or St. Beuno's mark. The money realised by the sale of these offerings was deposited in St. Beuno's chest, and applied either

\* Originally within the City wall, bought by Bishop Hugh, *ob.* 1298. Roger de Meyland removed to the Strand "inn," which, with those of Llandaff (*see* Fuller) and Worcester, the Duke of Somerset demolished.

\* Not a chalice, as stated in the illustrated programme of the meeting.



to the relief of the poor or to the repairing of the church.

A very similar offering chest at Old Upsala, in Sweden, is illustrated in "Sverige's Historia" (vol. 2, p. 465) and copied without acknowledgment in M. Paul du Chailly's "Land of the Midnight Sun."

In the north transept there is a brass dated 1633.

After leaving Clynog church St. Beuno's well was inspected. It lies close to the road on the east side, less than a quarter of a mile south-west of the village. The well, which is rectangular, is surrounded by a low wall with a seat or ledge round three sides of the well. There are some square recesses in the wall behind the seats. The well was one of those on the Pilgrims' road to Bardsey, and the structure is similar to those at Llanaelhiarn and at Llanberis. It was used as a healing well, the patient after bathing in the water being in some cases placed to lie all night on St. Beuno's tomb in his chapel. It is certainly very remarkable how the memory of a Celtic saint, dead more than a thousand years ago, still clings to a remote locality like Clynog, and if any proof were wanting of the great reverence in which he was held, we have it in the glorious, though now, alas! much neglected pile of buildings that has been raised over the spot where St. Beuno was buried. The existence of a cromlech with its cap-stone covered with cup-markings, a quarter of a mile south-west of the church, shows that even in prehistoric times Clynog must have been a place of considerable sanctity. It is the only megalithic monument in Wales showing any trace of sculpture.

Llanaelhiarn church, the next object on the programme, was a great contrast to the building we have just been describing. Clynog Fawr church has nothing in its architecture to distinguish it from an English ecclesiastical structure of the same period, but Llanaelhiarn church is characteristically Welsh, with its picturesque bell-gable and homely aspect. The ubiquitous restorer has done his best to spoil its simplicity of detail, and to bring it up to date according to his lights. An inscribed stone of the early Christian period was the subject of much discussion amongst the learned men present, including Professor Sayce and Professor John Rhys, who holds the chair of Celtic at Oxford. Notwithstanding the usual attempts to add a letter here and take away another there, until the stone was made to yield a result which should accord with the readers' pet theories, it was pretty generally agreed that the legend was as follows:—

ALIORUS ELMETUO HIC IACET.

Professor Rhys explained that this meant that the stone was the sepulchral monument of Aliorus, a native of Elmet, which latter place-name he compared with the ancient district of Elmet, in Yorkshire, and Cynwyl Elvet, in Carmarthenshire. The stone was found about 1865 whilst digging a grave in a piece of ground adjoining the churchyard called *Gardd-y-Sant*, or the Saints' Garden, and is now fixed in a horizontal position against the west wall of the north transept of the church inside.

The great event of the day was the ascent of Tre'r Ceiri from Llanaelhiarn, which had on this occasion to be made under somewhat unfavourable circumstances, owing to the thick mist hanging about the tops of the mountains. Tre'r Ceiri is situated a mile due west of the village of Llanaelhiarn, but the cliffs are too steep to allow of its being approached from this side. The summit was reached, therefore, by proceeding on foot a mile in a south-westerly direction along the road to Nevin and then striking off to the north-west up an ancient pathway over the mountain, so as to enter the fortress at the south-west end. On a clear day the views over the promontory of Lleyllyn, with the sea beyond, must be extremely fine, but only an occasional glimpse of the surrounding country could be obtained when a gust of wind cleared away the mist for a brief interval. The effect produced by the long procession of archaeologists winding up the mountain side, at one moment disappearing from sight in the mist, and at another making exaggerated silhouettes against the sky-line, was weird in the extreme. We have already mentioned that Tre'r Ceiri, or the Town of the Fortresses, is situated on the top of one of the three conical peaks of Yr Eifl. Seen from any point to the northward the three peaks appear to be in one straight line east and west. As a matter of fact, they are at three corners of a triangle. The central and highest peak is 1,849 ft. above the level of the sea; Tre'r Ceiri, the next highest, is 1,591 ft. above the sea, and lies due east of it between it and Llanaelhiarn; and the third and lowest peak

(1,458 ft. above the sea) is situated to the north-west, within half-a-mile of the sea. The prehistoric fortress of Tre'r Ceiri occupies the whole of the top of the mountain on which it stands. The ground plan is an irregular oval with its longer axis pointing north-east, and measuring roughly, according to the 6-in. ordnance map, 990 ft. long by 370 ft. wide.

The inner wall of Tre'r Ceiri is regularly built of dry rubble, with a straight and almost perpendicular outer face. On the north-western side, where the wall is highest, there is a *chemin de ronde* or *banquet* for sentinels to keep guard upon, with the protection of the parapet. Near the sally-port the *lanquet* is double. Where the wall is most perfect it measures 15 ft. in height and 16 ft. in width. The outer defences consist of low walls of rubble heaped up, not built. The whole of the interior of the fortress is filled with innumerable houses, both round, oval, and nearly square, arranged in groups. The walls are built of dry rubble, and are in some of the better preserved specimens as much as 4 ft. high.

We have devoted a good deal of space to the description of Tre'r Ceiri in order to show its unique character and magnitude. It would hardly be thought that in a civilised community it was possible for such a splendid specimen of a prehistoric city to be allowed to perish miserably, partly by neglect and partly by wanton injury. Yet stone by stone Tre'r Ceiri is being gradually destroyed. If an object-lesson were required to show the utter inefficiency of the present Ancient Monuments Act we have it here. The proprietor, Mr. R. H. Wood, F.G.S., of Rugby, applied to the Inspector of Ancient Monuments in order to have Tre'r Ceiri scheduled under the Act, but he was politely informed that the Government (one of the richest in the world, *soit dit en passant*) could not afford to incur the expense involved. Tourists and others now amuse themselves by tearing down portions of the ramparts in order to erect small cairns of stones which utterly disfigure the sky-line as seen from below. If the monument were scheduled it would be possible to reward these Goths and Vandals suitably with the two months' hard labour they most richly deserve.

The highest point, at the north-east end, is occupied by an artificial cairn of stones, probably used as a look-out post, and the ground within the walls slopes down considerably towards the south-west. Along the whole of the south-eastern side of the fortress the steepness of the cliffs forms an admirable natural defence. The wall is lower on this side, and there are no entrances or outworks of any kind. In one place there is a gap in the rampart, filled by a rock which rises above the top. Along the north-western side the slope of the ground is much less, necessitating additional outworks. The wall is higher and in better preservation on this side, and has three entrances—(1) a sally-port with a lintel, near the north-eastern and higher end of the fort; (2) an ordinary entrance between the sally-port and the south-western, or tower, end of the fort; and (3) a similar entrance, though smaller, at the south-western entrance of the fort. It was through the latter that the visitors entered. The entrances are in all cases defended by additional outworks. The Rev. E. L. Barnwell, who has described Tre'r Ceiri in the "Archæologia Cambrensis" (4th series, vol. ii., p. 71), thinks that some of the masses of stones strewn over the hill-side were placed there purposely to act as a sort of *chevaux-de-frise* to lessen the rapidity of the first onslaught of the besieging force. *Chevaux-de-frise* of this kind undoubtedly exist at Pen-Caer-Helen, near Conway, and in some of the great stone forts in the Aran Islands, off the west coast of Ireland, but it is rather doubtful if the sheets of loose stones at Tre'r Ceiri are artificial.

The party, after inspecting Dinas Dinlle, a British earthwork on the sea-coast occupied in Roman times, dined at the recently-erected hotel there, and then returned to Carnarvon, well satisfied with the result of the day's work.

The fourth excursion, on Thursday, July 19, was to Beaumaris (twelve miles north-east of Carnarvon) and Penmon (four miles north-east of Beaumaris), going *via* Bangor, and returning *via* Plas Newydd and Port Dinorwic. The total distance traversed was nearly forty miles, and the time occupied more than twelve hours. The programme was not adhered to, and the planning of the route does not do any great credit to the persons who arranged it. This excursion might have been much more easily made, as was originally intended, by steamer through the Menai Straits, landing at the various places on the way. The day was fine, and an ample opportunity was afforded for admiring the exquisite

scenery of the coast of North Wales and Anglesey from different points of view, and of contrasting the rugged outlines of the Carnarvonshire mountains with the tamer, but hardly less beautiful, landscapes of Anglesey. The party left Carnarvon railway station at 8.30 a.m. by train for Bangor, arriving at 8.59 a.m. Carriages were here waiting to convey the members to Garth Point, where they got on board the ferry-boat and soon reached Beaumaris. Thence they drove to Penmon Priory, (a distance of four miles); walked three-quarters of a mile to the place of embarkation for Puffin Island, and were taken across the narrow bit of sea in rowing-boats. The return journey to Beaumaris was made the same way, and after luncheon at the Bulkeley Arms Hotel, the carriages continued their journey along the north-western shore of the Menai Straits, as far as Plas Newydd (seven and a-half miles, S.W.), and on to the ferry, a mile and a-half further. The party crossed the ferry to Port Dinorwic and took the train to Carnarvon, arriving at 8.7 p.m. On the outward journey to Puffin Island no stops were made. On the return journey stops were made at Penmon Priory Church and Cross, Beaumaris Church and Castle, and Plas Newydd cromlech and chambered tumulus. By the kind invitation of Major Hugh Williams the members were entertained to afternoon tea at Plas Gwyn, close to Plas Newydd.

All that now remains of the ecclesiastical buildings on Puffin Island (also called Ynys Seiriol and Priestholm) is a solitary tower, almost the counterpart of the one at Penmon, surrounded by foundations, which would require to be excavated if it were desired to make out the ground plan properly. The late Mr. M. H. Bloxham has claimed an absurdly early date for this tower in the seventh century, but its similarity to the towers at Penmon, in Anglesey, and Bishopstone, in Sussex, point to the eleventh or twelfth centuries as the more probable period of its erection. Both the towers at Ynys Seiriol and at Penmon have pyramidal stone roofs, and double round-headed windows in the upper storey, with a central baluster or shaft. Giraldus Cambrensis mentions a curious legend to the effect that whenever the monks began to quarrel the island was invariably overrun with mice, who only disappeared when peace was restored to the community. The gamekeeper informed some of our party that after a recent wreck on the shores of the island it became suddenly infested by rats. These obnoxious vermin have, however, now been successfully exterminated by means of poison. The three names of the island sufficiently epitomise its past history. The wild haunt of the sea-gull is chosen in the early days of Christianity by a Celtic saint as the most suitable place of retirement from the world to be found in the district; a few centuries later the piratical inroads of the Vikings make the situation untenable, and it is probably deserted; lastly, the Pagan Norseman is converted and the monks again return, this time to build a church, the size of which indicates that the danger from the sea rovers was gone by for ever.

The architectural features of Penmon church were described by Mr. Arthur Baker, F.R.I.B.A. The plan of the building is cruciform, the north transept having been reconstructed on the old foundations during the restoration in 1855. The style is chiefly Norman, the most important features being the central tower, similar to the one on Ynys Seiriol, just described; the western arch beneath the tower, which has elaborately ornamented mouldings and capitals with rude figure sculpture; the arcade in the south transept; and the south doorway of the nave, which possesses a tympanum on the exterior, sculptured with the figure of a beast biting his tail, and some interlaced work. A curious carved figure is built into the exterior wall of the south transept, which the Irish visitors at once recognised as a "Sheel-na-gig."

When the members had assembled round the cross in the field above the church Mr. Romilly Allen delivered an address on the subject. He said that the art of the sculpture on the cross showed it to belong to the pre-Norman period, the character of the ornament being similar to that of the Hiberno-Saxon illuminated MSS. dating from the seventh to the eleventh centuries. In point of size and beauty the Penmon cross could not compare with the magnificent specimens at Clonmacnoise, Monasterboice and Kells, that were so familiar to the Irish antiquaries present. Nevertheless it possessed features of very considerable interest as throwing light on the development of so-called Celtic ornament. On one face was a typically Scandinavian pattern, resembling a chain of rings, which is found almost exclusively



on fons in Sweden, the rune-inscribed crosses of the Isle of Man and crosses on the neighbouring coast of Cumberland. On another face was a panel containing a figure of a saint with the nimbus round the head, with a beast-headed man on each side. A similar representation occurred on the cross at Moone Abbey and elsewhere in Ireland, and it had been suggested by the late Prof. I. O. Westwood that the subject represented was Christ seized by the Jews. On a third face was a square key pattern composed of T's, placed thus T T T, which was also to be seen on the Maen Achwyrian in Flintshire, Llangaffo in Anglesey, and on several stones in Cheshire. There was thus direct evidence of a mixture of Scandinavian, Irish, and Saxon art, which latter was more akin to Carolingian than to Irish art. Mr. Allen expressed his agreement with Professor A. H. Haddon in believing that mixture of race was an important factor in stimulating the intellectual faculties and producing an efflorescence of ornament in art. He did not think that the early Christian or pre-Norman art of England, Wales, and Scotland was imported *en bloc* from Ireland. It seemed to him far more probable that this particular phase of decoration, of which the characteristic features are interlaced work, key patterns and spirals, combined with zoomorphic designs in a peculiar manner, existed in varying degrees of perfection throughout Great Britain, and in some parts of Europe, from the seventh to the eleventh centuries, and that it was developed differently in different localities, a good deal depending on the relative strength of the Scandinavian, Celtic, or Saxon influence existing at a particular time or place.

Mr. Allen referred briefly to two other monuments of the pre-Norman period at Penmon, namely the cross-base utilised as a font in the church, and the shaft built into the wall of the Refectory as the lintel of a window. It was suggested that this shaft possibly was the one belonging to the base mentioned, and the desirability of having it removed from its present position and placed within the church. In conclusion, the lecturer referred to the damage the cross in the field near the church had sustained by being used as a target for rifle-shooting by stray Volunteers who had a range in the neighbourhood.

Mr. Thomas Drew, F.R.I.B.A., President of the Royal Society of Antiquaries of Ireland, spoke in reply, and dissented from Mr. Allen's theories as to the existence of Scandinavian influence in pre-Norman art.

Beaumaris church possesses but little interest architecturally. A sixteenth-century brass to Richard Bulkeley and his wife Elizabeth, and two fifteenth-century alabaster effigies of a knight in armour and a lady, are the only objects worthy of notice.

Beaumaris Castle is one of the least picturesque Edwardian fortresses in North Wales, but it contains a beautiful chapel.

The Plas Newydd cromlech and chambered tumulus are well known as being, perhaps, the most remarkable megalithic monuments now existing in the Principality.

The fourth excursion, on Friday, July 20, was by carriage to Llanberis (10 miles south-east of Carnarvon), going via Llandeiniolen and Pen-y-llyn (at the north-west end of Llyn Padarn), and returning through Llanrug. On the outward journey to Llanberis church stops were made at Dinas Dinorwig (half-mile south-east of Llandeiniolen), Doldadarn Castle at Llanberis, and St. Padarn's Well, near Llanberis Church. On the return journey a stop was made at Llanrug (three miles south-east of Carnarvon) to see the Roman inscribed stone in the grounds of Pantavon (three-quarters of a mile north-west of the church). Luncheon was provided at the Victoria Hotel, Llanberis. Before returning, some of the party drove about two miles beyond Llanberis, towards Capel Curig, for the purpose of enjoying the beautiful scenery of the Pass of Llanberis.

Dinas Dinorwig is an ancient British earthwork of oval shape, measuring about 400 ft. by 380 ft. internally, and defended by a formidable double rampart. The strategical position is an important one, as being on sufficiently high ground to command a view of the whole of the surrounding country which lies between the mountains and the sea. A plan and description, by Professor C. H. Babington, will be found in the "Archæologia Cambrensis" (3rd series, vol. vii., p. 236). Dinas Dinorwig was probably used as a military post on the Roman road from Conovium (through Aber) to Segontium, and it was here that the Roman inscribed stone now

in the grounds of Pantavon, near Llanrug, was discovered some eighty years or so ago.

Llys Dinorwig now shows very little trace of having been an ancient site, and was hardly worth visiting.

Doldadarn Castle is a solitary round tower, with a rectangular excrescence at one side, situated on a hillock at the north-west end of Llyn Peris, and built by Edward II. to guard the mountain pass. On the opposite side of the lake the whole face of the cliff is cut into terraces by the great slate quarries, which utterly destroy the beauty of the scenery. Whilst the visitors were inspecting the castle, the blasting operations produced a miniature thunder, which reverberated from rock to rock till the last feeble echo died away in the far distance.

Llanberis church is small and uninteresting. Some of the graves in the churchyard are planted with box-trees, clipped into the shape of a rectangular block, with a cross in relief on the upper surface. Considerable excitement was caused amongst the members at the Saints' Well, near the church, by the ineffectual attempts made to dislodge the trout which is known to inhabit it from his hiding place. In vain was the fish tempted by worms dropped into the water, and walking sticks poked into the furthest recesses of the structure built round the well were equally unsuccessful in inducing him to appear before so learned an audience. The non-appearance of the fish is said to be an evil omen.

The proceedings of the meeting practically came to an end with the evening meeting at the Guildhall, on Friday, when papers, with limelight illustrations, were read by Mr. J. L. Robinson on the "Progress of the Antiquarian Photographic Survey of Ireland," and by the Rev. Denis Murphy, S.J., on "Irish Art as shown on Irish Crosses." Albums containing the photographs already taken for the survey were exhibited, and a device explained which allowed of the rearrangement of the order of the series at any time.

Most of the members of the Irish and Welsh societies left Carnarvon on Saturday morning, but some stayed behind to see the castle, Llanbellig church, and the site of Segontium.

#### BRITISH INSTITUTE OF PUBLIC HEALTH: ANNUAL CONGRESS.

THE annual Congress of the British Institute of Public Health, which is being held at King's College, London, commenced on Wednesday, when a reception took place at King's College. The real work of the Congress, however, began on Thursday, when the Presidents of the various sections delivered their addresses.

The address to the Section of Engineering and Building Construction, was delivered by Professor Banister Fletcher, F.R.I.B.A., J.P., D.L., President of the Section, who said:—"The duty of the President in this section in his Presidential address appears to be of two kinds. *Firstly*, to summarise what advancements have taken place; and, *secondly*, to indicate what improvements are still desired. Probably no more useful work can be attempted than bringing defects before this large Congress, all of whose members are deeply interested in sanitary science, especially that part of it which belongs more properly to our own professions. With regard to the first part—viz., what has been done—in the limited time at my disposal I can only briefly give a mere outline sketch. The Public Health Act, London, 1891, did in a large measure for the Metropolis what the Public Health Act, 1875, did for the rest of the country. It consolidated a large number of statutes hitherto in force in the Metropolis relating to Public Health, and introduced important alterations in the existing law. An important feature in the new statute being the powers and duties entrusted to the London County Council, they were empowered to make by-laws for many purposes, and to them was entrusted the power of taking action in the event of any default by any Sanitary Authority other than the Commissioners of Sewers. The Act deals extensively with the offensive trades, entirely forbidding some, and requiring the sanction of the London County Council for others. It abolishes the duties formerly incumbent on occupiers of premises to sweep and cleanse footways and water-courses. Another important provision is that if the water-company cut off the water supply from any dwelling-house they must give notice to the Sanitary Authorities. Any person may now give information of a nuisance to the Sanitary Authority, and such Authority is

required to serve at once a notice causing the same to be abated. Sanitary Authorities are bound to secure the due removal, at proper times, of house refuse, &c., from premises; and if not done after forty-eight hours' notice, the offenders are liable to be fined 20s.

The London County Council General Powers Act, 1890, gave a person power to appeal against the certificate of the superintending architect as to line of frontage, to a tribunal composed of a member of the London County Council and one member of the Royal Institute of British Architects, and one member of the Surveyors' Institution. It also gave the Council power to make by-laws with respect to materials and plastering, &c.; and limited the height of buildings to 90 ft., exclusive of two stories in the roof. The London Sky Signs Act forbade the future erection of these monstrosities, and will eventually cause the remaining ones to be taken down.

The London Streets and Buildings Bill, which has every likelihood of becoming law, is a Bill to consolidate and amend the enactments relating to streets and buildings in London. The idea is to repeal the thirteen Acts under which at present all buildings are regulated in London, and to form a new Act which will embrace the regulations in these Acts and embody other regulations of great importance. This Act is at present liable to so many alterations in the House of Lords that I will not mention it further, except to say that it seems to me to be an Act that is much required, though I cannot agree with some of its proposed regulations. It is self-evident that you may make the most perfect rules and by-laws and yet not have good buildings, unless those whom you appoint to supervise *do themselves understand* how the work should be done. I would lay stress on this, because it has too long been considered that anyone can be a Sanitary Inspector. The principal, for at least the most important, duties are those of seeing that buildings are properly built, and the drainage work properly executed with proper materials, and clearly the best man for such work is one who has been practically brought up in the building trades. It is far easier, I venture to think, for such a man to learn when he should condemn bad meat, and those other duties he has to perform, than for the man who may know such matters to learn the building trades. It is too often overlooked that the Medical Officer of Health is the real authority, and that in the "Sanitary Inspector" he requires a man so skilled that he can see that the work ordered is carried out in a proper and workmanlike manner. In the past many of you have found Inspectors of Nuisances, as they were called, ordering certain traps and closets, and without having the faintest idea of how they should be fixed—satisfied if only they saw the name on the article; while, as you know, the proper fixing is most important. One other advance I have to record—the examination of Sanitary Inspectors which is required by Government, and which commences next year. Undoubtedly this should place the carrying out of the sanitary requirements upon a better, more uniform, and intelligent basis. I hope the Sanitary Inspectors may continue to make London their headquarters, read papers and have discussions, and thus keep themselves well informed as to all the new inventions and improvements in building. I believe, should more room be required for the use of their Association, the Worshipful Company of Carpenters will try to meet the requirement. While singing congratulations on this good progress, I regret I must call your attention to what I venture to think is a serious drawback to good sanitary building. It is, that there is no one Authority dealing with the subject. At present each man is a law unto himself, and Vestries and Local Boards have rules and regulations differing from each other. I will not weary you with illustrations, as we have a discussion on this subject. My hearers know only too well how curious are the variations—how one kind of "closet," "pipe," or "trap" can be used in one district, while in others it is not permitted. Again, if the requirement is fought, often no amount of scientific and practical knowledge will convince one Court, and yet again, in another Court, it will be accepted. Surely this must be wrong; it leaves sanitation so uncertain, and really prevents all advance. What appears to me to be wanted is one simple permanent Court of Appeal, which should sit whenever cases wanted its decision, and should be composed of two persons, or certainly not more than three. I would suggest for your consideration that, if only two, then one should be a medical man who has had to deal with sanitation, and the other an architect or engineer; if a third



is desired, he might be a barrister. One point I want just to say a few words about—it is the great drawback of the present Courts—viz., the long delays. I would, therefore, insist that the cases should go on from day to day until ended, and that the Court should form the body required under the new London Streets and Buildings Bill, for that Bill has, in my opinion, as it now stands, a very complicated, changing, and expensive tribunal.

In regard to *drainage* and the method of ventilating public sewers, about which so much has been written of late, I note the idea of Mr. Ernest van Putten, in the *Builder*, who says, "that the interceptor is a small cesspool, and that the house-drain contains deposits of soil uncovered by water, and is consequently more foul than the public sewer, in which the flow is always proceeding;" and he goes on to say, "the liability to stoppage in the interceptor is greater than in the straight drains; and that in Lewisham, where not more than 1 per cent. of the house-drains have interceptors, the annual death-rate has been exceptionally low for many years." Doubtless, intercepting traps may interfere with the flow, but we know their value in other respects, not the least important of which is the intrusion of rats from the main sewer. The question of ventilating the public sewers is one which necessarily brings itself before us during this exceptionally hot weather, and it is a question worth discussing whether, instead of the gratings at the street level, ventilating pipes should not be carried to the ridge level; though the question of expense seriously militates against this. Mr. Bernard Dicksee has again raised the well-known question, not of the interceptor, but of the size of the drain-pipes. It appears to me, as it does to most sanitarians, that for an ordinary house with, say, three closets, 4 in. is not only sufficient, but more cleanly and less expensive. More experiments under this head would doubtless be beneficial. There have been many patent innovations in drain-pipes and joints, but it is doubtful whether, for a long time to come at any rate, well-made brown-glazed stoneware pipes, with cement joints with hemp filling, properly laid on an even bed of well-rammed concrete, can be surpassed, though, perhaps, under a house, the 6 ft. lengths of cast-iron drain-pipes, glazed internally, with caulked junctions encased with concrete, are preferable.

With regard to the carcass and fittings of an ordinary building, and the necessity of using only the materials which are most conducive to the sanitary condition of the structure and the inmates, we might profitably dwell for a short space. Our first care should be to have bricks as little porous as possible, consistent with strength and weathering qualities. The power of building nine-inch brick walls in upper stories is surely not conducive to the dryness of the fabric. This is permitted in London, but not in the country under the municipal by-laws. I am glad to see that the plastic asphaltic damp course has almost superseded the old slate damp course with its liability to fracture, the former being also of incalculable service as a vertical damp interceptor. These precautions, together with the covering of the site with six inches of concrete, should prevent saturation of the building by damp being drawn upwards. We have the danger of dry-rot by not properly ventilating our floors, but even when attempted, I would call attention to the slipshod way the air bricks are often placed, with no regard to the necessity of a through current of air, the latter being often stopped by a sleeper-wall. I have even seen air-bricks so placed at the ground-level that their only use was to convey water into the interior of the building. With regard to the chimneys, I wonder how long we shall continue to have the old 14 in. by 9 in. flues formed of brick, and sometimes improperly parged, when it has been so clearly demonstrated that it is impossible to clean the angles, and when an ordinary 9 in. unglazed drain-pipe is so much preferable in every way, as no contraction can take place at the angles in building the flue, and the sweep's brush fills and cleans the whole aperture.

In regard to the construction of floors, one wonders how much longer we shall continue to construct the ordinary timber floor with the space between the boards and the plaster ceiling, a receptacle at once for dirt and vermin, the former intensified by the weekly wash of the charwoman's dirty water, which, even if avoided by pugging, renders the floor timbers very liable to dry rot. It seems to me that a building, to be thoroughly sanitary, especially in the Metropolis, should have fire-resisting floors, with wood-block flooring in immediate contact with

the concrete, and that these should be cleaned, not with water, but with turpentine, which is a disinfectant. The above is especially required in the construction of flats now arising throughout London, where so many people are under one roof. The old quarter partition, with its space for the agglomeration of filth, and in fact all dirt-collecting construction, should surely be avoided, and in its place the new 3-in. concrete partitions, for which so many patents exist, are much to be preferred. The ordinary breeze concrete, with iron uprights, is, perhaps, as good as any, and cheaper than all.

With regard to finishing, the new by-laws of the London County Council as to plastering are to be commended, and it appears to me that they might well go further and require that all ground-floors and basements should have skirtings of solid cement, instead of the ordinary wood skirting, which too often harbours the dirt in the space behind it.

Having now dealt with the building, let us consider the plumbing and water supply. With regard to this, I consider much improvement necessary, and special efforts, to my mind, should be directed to obtain a Court of Appeal to ensure greater uniformity. For instance, for some years almost every Local Authority insisted on the "wash out" closet as the most perfect; to-day it stands condemned as foul and unhealthy, and thousands and thousands of houses have been fitted with this form of closet. To my mind, there is no doubt that the best form of closet for a private house is the valve closet, *provided always* that every part of its construction is the best of its respective kind. If expense prevents this, it is far better to employ an ordinary "wash-down" closet fitted with water waste preventer and a three-gallon flush. There are many who advocate this quantity of water, and the fact, I think, we should impress upon the Legislature is that wasted water is not an unmitigated evil. As my friend, the late Sir Edwin Chadwick, so earnestly advocated many years ago, one ought to get a volume and great rapidity, so as to force all matter through the pipes; but water will do good, even by passing away in small quantities. The improved joints with brass ferrule for the connexion of the apparatus with the soil-pipe leaves little to be desired. Baths, lavatory, basins, and other fittings of this type should be left free from any so-called casings, so that light and air may play their important functions undisturbed. As to disinfectants, though we ought to place no material reliance in them, we have found in the Commission of Sewers that the free use of the disinfectants over the roadways, and especially those laid with wooden blocks has entirely prevented nuisance arising from the droppings of animals and other sources of pollution. I think it my duty to mention, before leaving this portion of the subject, the important question of wall coverings. The sanitary paper was, no doubt, an improvement on the old papers, containing arsenic, &c.; but the more recent inventions of the papier-mache and linocrusta type, which are non-porous and practically everlasting, are well worth the additional outlay, both from a sanitary and artistic point of view.

As a sanitary necessity of the first class we all believe that cleanliness is next to godliness, and therefore many visitors to this great city, after having inspected the various buildings and works, will be surprised at the absence of swimming and other baths. I have now for some years tried to have this defect removed, and at meetings have moved resolutions, which have been carried unanimously, calling on the Corporation to undertake this work. At the Court of Common Council I have also advocated this step, citing as an instance that Rome (not popularly supposed to be a cleanly city) had her great baths of Caracalla and Diocletian, &c. I have been met by two arguments—1. That outside the City the various parishes had erected baths and washhouses. 2. The great cost. I admitted the first, because not only have the vestries done their duty in this respect, but my own City Company has built one of the largest swimming-baths in London, at Stratford; but I pointed out not only were more baths required, but it was unfair to force the City people to these baths, which were required for their own inhabitants, and that the City should provide them for their own schools and residents. As to the second reason, I urged that the outlay might be extended over many years, and that now the Tower Bridge is completed, the Corporation had no creative work in hand. I am hopeful this Congress may urge forward the Corporation to desire to confer a grand scheme, a monumental scheme, so that,

when erected, our baths shall be the admiration of all cities.

Next to our houses and sewers, the sanitary condition of our streets seem to claim an important place. We have, I believe, no paper dealing with the most sanitary material for the making of our streets; but after your experience here in London for a day or two, you will perhaps be inclined to think that wood, possessing the porous qualities it does and giving out unpleasant odours, is not the best material, though, perhaps, it is possible to invent some composition to impregnate the wood and so prevent the porosity. Asphalt from a sanitary point of view being impervious is undoubtedly the most fitted, but from a humanitarian view can scarcely be commended. It seems that here, at least, is a great opening for the inventive genius of our engineers.

Next to the paving, the keeping of our streets clean must claim our attention. This brings to my mind the recent experiments at Worthing, of sea water for flushing the sewers and watering the streets, and this brings before us a much bigger question, the supply of sea water to London for bathing. Speaking from memory, I think I am right in stating that a company was started, some fifty years ago, to bring sea water from Brighton, and a portion of the works were carried out, but the project was abandoned for a reason I cannot remember. Providing it is practical—and now nothing seems impossible to our engineering confères—I can scarcely conceive of a greater benefit to our five million inhabitants than a double supply of water; because having the second supply, viz., salt water, the present sources of fresh water supply would remain sufficient for all time, thus avoiding the expense of the proposed idea of bringing water from Wales. It is clear that with regard to its advantages and disadvantages, more experiments are requisite before a decision could be arrived at, and, of course, information is required as to the practicability, having regard to cost and other considerations.

We shall report the other proceedings of this section of the Congress in our next issue.

#### THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

*The Chairman's Annual Address.*—The first business was the delivery of the annual address by the Chairman, in the course of which he said that the report of the Bridges Committee dealt with some interesting facts in connexion with the Thames bridges and recorded what might be regarded as the fairly satisfactory progress of the Blackwall tunnel. The contract amount for that work was £81,000, and the estimated value of the work executed up to the end of the financial year was £268,773. The working under compressed air in that great engineering feat was proceeding practically without accident. The pressure at present used was about 20 lb. above the normal atmospheric pressure. The Woolwich ferry returns continued to show increased traffic. 3,710,822 passengers and 272,764 vehicles used the ferry during the year, so that, roughly, in fifteen months the ferry carried the population of London. Due diligence was shown in the carrying out of the regulations under the Thames River (Prevention of Floods) Act. The reconstruction of Vauxhall Bridge, which it was proposed to include in the Council's Improvement Bill, to be submitted to Parliament in the session of 1895, was estimated to cost £454,000. The bridge would be 80 ft. wide, and provision would be made for the construction of a tramway, thus bringing Vauxhall and Victoria railway stations into easy communication. The rebuilding of Lambeth Bridge must, the Committee said, follow at no distant date. The Building Act Committee continued to be presided over by Dr. Longstaff with distinguished ability. The amendment of the building law under the title of the London Streets and Buildings Bill now before Parliament would, he hoped, soon become an Act of Parliament. No less than 6,286 cases of dangerous buildings were dealt with last year. Regulations had been made whereby the height of hoardings used for advertising purposes around vacant land had been restricted to 12 ft. He wished, instead of the hoarding for advertising purposes round vacant land, owners would follow the practice of the Council, the Commissioners of



Sewers, and a few large owners of land, and erect a palisade fence and prohibit bill-sticking. Two hundred and forty-seven sky-signs had been taken down, and 169 licenses for sky-signs had been granted for the limited period defined by the Act. . . . The list of improvements in the hands of the Improvements Committee, either completed or in progress, included the four bridges at the Isle of Dogs; Evelyn-street to Creek-road, Deptford; St. George's-place, Knightsbridge; Fulham Palace-road and Queens-street, Hammersmith; Fortress-row, Kentish Town; and Sandy's-row, Bishopsgate, a northern approach to the Tower Bridge. With regard to the southern approach to the Tower Bridge, the Council would remember that in that matter the insistence upon the application of the betterment principle had delayed the improvement. In the opinion of the Council it was especially a case in which betterment should be made to apply. The Council was quite consistent in its action in refusing to execute the improvement until the principle was admitted by Parliament. As regarded the much-abused fountain at Piccadilly-circus, known as the Shaftesbury Memorial Fountain, it was still subject to the experiments of the Improvements Committee. He hoped that in the ultimate recommendation the committee would justify its delay. Three improvements were mentioned in the report as suggested by the committee, but not agreed to by the Council, and as they stood at an estimated net cost of 2,400,000, they had not far to seek for a reason for the Council's disagreement. If the rates were to go up by leaps and bounds, and the ratepayer was willing to stand it, then improvements could be conducted upon the old lines to any extent the Council might determine. But were the ratepayers willing to pay all the cost of practically limitless improvements? He thought not. . . . The Main Drainage Committee had during the past year executed an amount of work which was most gratifying. That Committee was presided over by Mr. McDougall, whose devotion to the Council's work and whose energy in its execution were well known. In the Council's sluice vessels last year there were sent to sea 2,102,000 tons of sludge, necessitating 2,102 trips, and the Council, without opposition, had decided to build an additional vessel, thus making six in all. The deodorising operations were during the past year carried on at fifteen different stations, and no less than 214 tons of chemicals were used in the process. At Barking and Crossness outfalls minute attention had been paid to everything which was likely to conduce to the efficient and scientific working of those stations, and the erection of Worthington engines at the new engine-house at Abbey-mills had increased the pumping power at that station by about eighteen million gallons daily, thus relieving the low-lying districts of Hackney-wick and the Isle of Dogs from flooding. So satisfactory had been the result of the working of those stations that the costly scheme of sewer reconstruction spoken of some time since could not doubt with safety be very largely modified. The sewers which in 1880 were regarded as totally inadequate for the wants of the district had not only been put in a condition making them able to efficiently discharge their present duties, but to leave a very considerable margin for future years. The condition of the waters of the Thames at the sewage outfalls had not only been kept up to the satisfactory standard attained last year, but the reports were more favourable still. The offensive black mud-banks had disappeared, and given place to clean shores consisting of gravel, clay, or river mud. Not a single complaint was received during last summer from the local riverside authorities. Further, different kinds of fish had been found in various parts of the river where none had been seen for several years. Upon sewer air a series of experiments had been made, proving scientifically that the micro-organisms of sewer air were almost invariably fewer in number than the micro-organisms of fresh air; but in spite of science, and the startling conclusions to which that investigation had led, he infinitely preferred fresh air to sewer air. . . . The report of the Water Commission was of the most unsatisfactory and conflicting character, and the more one knew of the subject the more difficult did it appear to agree with the findings of the Commission upon many important branches of the question. The appropriation of more water from the Thames, instead of affording a permanent settlement of the London water question, only postponed the grappling with it a few years, when very difficulty with which the question was now surrounded must be enormously increased. The

Parliamentary Committee was now proceeding to draft Bills, in conference with the Water Committee, dealing with the acquisition of the undertakings of the present water companies, upon fair and reasonable terms, as a step to the equipment of the Council for the discharge of the responsible duty of being the water authority in London. The Works Committee, presided over with great ability by Mr. Robert Lyon, had made a substantial commencement in discharging the onerous duties committed to them. Some 55,000*l.* worth of work had been executed, and about 180,000*l.* worth was being proceeded with. The slopping and watering of the Embankment and bridges had been executed by that Committee, also hoarding and shoring, together with extensive jobbing works. He did not suggest that slopping work was done better when the carts and vans started to perform it in a clean condition, but it certainly was not attractive to see the Council's vehicles covered with mud from end to end, affording unfavourable comparison with the smart turn-out of some local bodies whose names he would not immortalise by mentioning. He hoped the Works Committee would take the hint. With regard to the quality of the work done there were few persons who complained of it. With regard to the cost of such work some people thought that there was more to be said. But were they, as a public body, unwilling to put anything to the credit of quality? His preference would be for good work—not, of course, with total disregard to cost, but with a due appreciation of the fact that cheapness and excellence were seldom compatible. The one danger, and probably the only danger which the Works Committee had to fear—apart from captious criticism which it could safely refute—was that the workman might not be disposed to do as good work for the Council as for a contractor. If that were so it was little short of suicide on the part of the workman. He had yet to learn that the British workman would allow the grandest chance that Labour had ever had in London to slip through his fingers. He believed that the Works Committee would not only justify its existence, but would prove to other municipalities awaiting their experiment that under proper management that thing could be done, and done to the satisfaction of all parties. The period was approaching when the healthy glow of public opinion would make itself felt in the approval or condemnation of the Council's policy. The verdict was with the ratepayers, but for his colleagues he should always claim that they had been loyal to the particular pledges given by them at their election; and in the thousand and one matters in which they had exercised their independent judgment he further claimed for them that they had done so with singleness of purpose and distinguished ability.

Dr. Collins moved that the address be printed and circulated.

Mr. H. P. Harris seconded the motion, which was carried.

**Blackwall Tunnel, Southern Approach.**—The fourth paragraph of the Bridges Committee was as follows, the recommendation being agreed to:—

"As the Works department will soon complete the paving works in Blackwall-lane, we would suggest that the department should be entrusted with the paving works in Trafalgar-road, East Greenwich, and in the remaining portion of Blackwall-lane. We submit the plans, specifications, and bills of quantities for these works, which are estimated to cost 10,800*l.* We recommend

"That, subject to an estimate being submitted to the Council by the Works Committee as to the preliminary estimate, the works in connection with the paving of Trafalgar-road, East Greenwich, and a portion of Blackwall-lane be constructed by the Council without the intervention of a contractor, at an estimated cost of 10,800*l.*, and that the plans, specification, and estimate be referred to the Works Committee for that purpose.

**Art Scholarships and Exhibitions.** The report of the Technical Education Board contained the following paragraph:—

"For the Evening Art Exhibitions 157 candidates sent in their names. For the Artisan Art Scholarships 41 candidates, and for the Schools of Art Scholarships 46 candidates. The examination for the Evening Exhibitions was held simultaneously at the Goldsmiths' Institute, the Clapham School of Art, the Regent-street Polytechnic, and the Camden School of Art, all of which were kindly lent to the Board for the purpose. The examination for Artisan Art Scholarships occupied three evenings, and was conducted at the Regent-street Polytechnic. The examination for Schools of Art Scholarships occupied two evenings, and was also conducted at the Regent-street Polytechnic. The papers were set and the work examined by Mr. Edward R. Taylor,

Head Master of the Birmingham Municipal School of Art. The Board has under consideration the results of these examinations and the examiner's report."

After transacting other business, the Council adjourned at seven o'clock.

### COMPETITIONS.

**COUNTY ASYLUM, WINWICK.**—A special meeting of the Lancashire Asylums Board was held on the 19th inst. in the County Hall, Preston, to consider the report of the Winwick Asylum Committee upon the plans and estimates for the new county asylum at Winwick. Mr. Howell, Architect to the Commissioners in Lunacy, recommended three out of twenty-two competitive plans sent in for consideration, and placed them, as we have already stated, in the following order:—First, Messrs. Giles, Gough, & Trollope; second, Mr. G. T. Hine; third, Messrs. Henry Crisp & Oatley. Of these the committee recommended the board to accept Messrs. Crisp & Oatley's plan as being the most suitable. The chairman said there was a discrepancy of 76,000*l.* between the lowest and highest original estimate, and one of 13,000*l.* between the lowest and highest amended estimates. The committee believed that by alterations that discrepancy could be reduced, or they would not have been so unanimous in their decisions. Mr. J. Houlding, Liverpool, proposed, "That the report of the Winwick Asylums Plans Committee be received and adopted, and that a committee be appointed with power to confer with the architects on the plans, and submit the same to the Commissioners in Lunacy for their approval." Mr. McClure, Liverpool, seconded, and the resolution was carried.

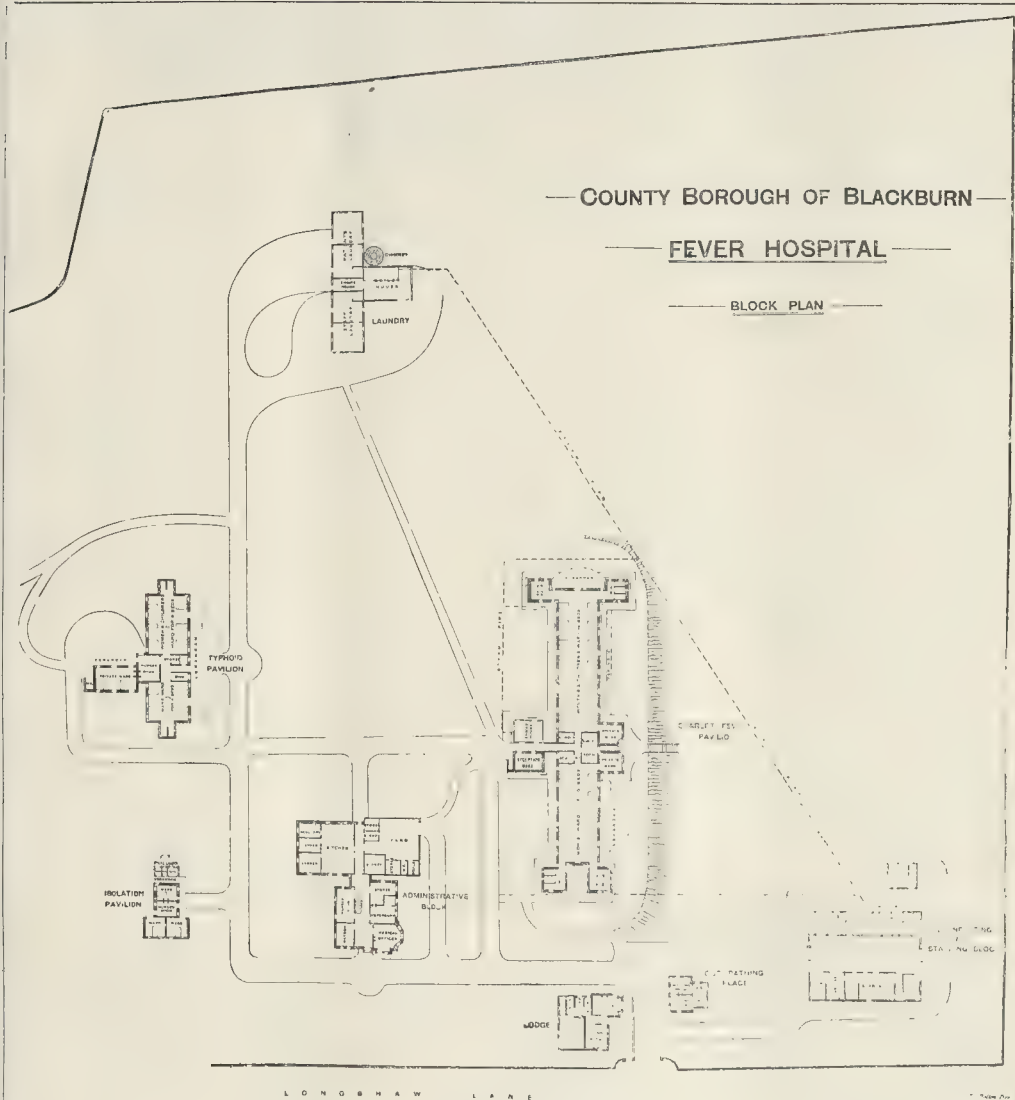
### ARCHITECTURAL SOCIETIES.

**DEVON AND EXETER ARCHITECTURAL SOCIETY.**—The Devon and Exeter Architectural Society visited Plymouth on the 21st inst., for a conference relating to professional education in the counties of Devon and Cornwall, and the extension of the society's work in those two counties. The party was met at Millbay station by Mr. J. Hine, with other local architects, and proceeded to the Athenaeum, where the chair was taken by the President, Mr. J. Jerman, who stated that the object of the meeting was to hold a friendly conference with their professional brethren of the district on the subject of architectural education, and the extension of the society's area of work over the two counties of Devon and Cornwall as laid down by the Royal Institute of British Architects. A discussion followed, during which many suggestions were offered, and the Council of the Society was requested to take this and other matters into consideration for bringing before a meeting of architects of the province.—In opening the discussion, Mr. Thorne (Barnstaple) speaking of architectural education, dwelt upon the necessity of the provision of a circulating library for the benefit of students, so that similar advantages might be given as were provided for London and other districts, and he suggested that a fund should be raised for that purpose. The suggestion was cordially approved by several speakers. The following resolutions were eventually passed:—

"That the Council of the Society consider the desirability of providing for lectures of an educational character." "That steps be taken to harmonise the name of the society with the district included by the Royal Institute of British Architects, viz., Devon and Cornwall." After luncheon the following places of interest were visited: Armada Monument, the old Eddystone, and seventeenth-century Citadel Gateways, St. Andrew's Church, the Guildhall and Municipal Buildings, the Corn Exchange and Markets, St. Matthias Church, Co-operative Company's Buildings, St. Peter's Church, and St. George's Hall.—At the conclusion, on the proposition of Mr. Appleton (Torquay), a vote of thanks was unanimously accorded to Mr. Hine (Plymouth) for the assistance he had rendered in promoting the success of the day's proceedings.

**THE NORTHERN ARCHITECTURAL ASSOCIATION.**—The annual excursion of this body was held on Saturday, 21st inst., at Thirsk, Knepp, and neighbourhood. Twenty-seven members of the Association met at Thirsk, being from Newcastle, Gateshead, Morpeth, North and South Shields, Sunderland, Durham, Darlington, Mid-





dlesbrough, and Leeds. The party travelled by special saloon carriage from Newcastle. Conveyances were in waiting at Thirsk station, and the members were driven to Coxwold (passing Shandy Hall), where the church was inspected. They then proceeded to Byland and Rievaulx Abbeys, where a very pleasant afternoon was spent. The members afterwards returned to Thirsk, and dined at the Fleece Hotel.

#### BLACKBURN FEVER HOSPITAL.

We give here the block plan of this hospital, which was opened by the Mayor of Blackburn on Wednesday last. The hospital is planned by and built under the superintendence of Mr. McCallum, the borough engineer of Blackburn. Some further particulars will be found under the head of "General Building News."

In regard to the absence of a scale on the plan, it was sent with the mere statement "thirty feet to one inch," without any drawn-out scale; a system we have often deprecated. In reduction this of course would become incorrect. As it stands on our page it is about 90 ft. to an inch.

### Illustrations.

#### COMPETITION DESIGN FOR CHRIST'S HOSPITAL SCHOOLS.

**A**S before, we devote one number to the illustration of one of the designs in this competition, that sent in by Mr. Ingelow under the old denomination of the firm, "Carpenter & Ingelow." As in the case of the premiated design, we give an extra-size plate to the general plan, which is in many respects a remarkable one. We add a plate of elevations and sections of the principal buildings, and the two perspective views of portions of the exterior. As in the case of the two other designs previously illustrated, these perspective drawings have been kept, in accordance with the instructions, to the condition of simple practical illustrations, without any attempt at effect. The architect's intentions in the design may be best described by the following quotations from his report:—

"We have arranged the various buildings of the senior school in quadrangular form, the 'Boy's Houses' being on the west and south sides; and museum, library, great hall with its class-rooms, the chapel on the east; the dining halls, kitchen

and offices, court-room, drawing school and gate-house on the north.

The music house has been placed inside the quadrangle, to the south.

The main cloister connects the whole of these buildings together, so that there is a complete covered communication from each one of them to all the others. At the same time the 'houses' do not open directly into the cloister, but are joined to it by short covered ways, so that the boys of one 'house' would not have to enter or make use of the passages or any part of any other 'houses.'

But the cloister and covered ways being only one story high, there is no through communication except on the ground floor, so that each 'house' is separate, and could be entirely isolated from the others if need were.

That this breaking up or a large number of inmates into groups is considered by sanitary authorities of the highest importance will be obvious from the fact that at the Central London Schools at Hanwell, which were in the form of a long enormous block, cuts have been made, and portions of the building pulled down, so as to break up the whole into separate pieces.

The cloister and covered ways do not hinder the free circulation of air; they are only one story high, and the windows of the latter are not glazed.

The houses have been arranged in blocks of two. Taking one of these; each of the two houses has on

the ground-floor two day-rooms, prefect's study, lavatory, changing, and bath-room, &c. There is an outside door for boys coming from the playing-fields. The stairs are central. On the two upper floors are the dormitories, bath-rooms and lavatories, and masters' rooms, all connected together by the main corridor. The urinals and water-closets for night use are in small semi-detached blocks, not opening directly out of the corridor, but connected with it by a small lobby with cross ventilation.

The servants are placed centrally in a building of their own. On the ground floor is the matron's room, work-room, &c., and back door and stairs. On the first floor is the matron's bed-room, and on the second floor the servants' sleeping-room. There is no communication between this floor and the dormitories, but on the ground and first floors there is a passage to the main corridor. The lift is placed centrally.

In each block there are rooms for four masters, and in three of the blocks accommodation is provided for a married man.

Generally, all the dormitories have windows on both the long sides, as well as at one end, and in every case one long side, faces south or west, and one end wall faces south or west. Through ventilation and ample sunlight are thus secured.

It will be seen that neither boys nor masters will sleep on the ground floor, and that no boy will have any occasion to be on the upper floors from the time he leaves his dormitory in the morning until he goes to bed at night.

The chief educational buildings are placed on the east side of the quadrangle. The central hall will accommodate 1,000 on the ground floor and also an orchestra of 100, while in a gallery at the west end there are seats for about 150 more. The head-master's private room and class-room, and thirteen other class-rooms, and the prefect's common room, open out of the hall, which is lighted at both sides and one end, and the other required class-rooms are near it, arranged in a two-story block.

We should propose that the wainscoting in the present great hall should be used up, as far as may be, in the new one, the shields being fixed as shown, and the armorial glass in the windows would be refixed in the windows and in ante-hall.

The museum and library are placed one over the other in the same building.

At the north end of the east walk of the cloister, and opening out of the ante-hall, is the chapel, which provides sittings for rather over 1,000. The small side chapel or north aisle has a separate passage leading to it, which might be convenient for the use of visitors and servants. The organ and vestries are placed in the south aisle. The seats are arranged as in a college chapel, facing north and south, the masters and senior boys sitting in the back row or stalls; this arrangement has been adopted in all the large schools where we have built chapels (Ardingly, Hurst, Denstone, &c.), as being, on the whole, the best.

The dining-hall is on the north side of the quadrangle, with an ante-hall between it and the chapel; it will seat 840. On its north side are the kitchen and offices. The kitchen itself is 54 ft. by 40 ft., and about 40 ft. high. From our experience in other cases we feel sure this will be quite large enough; the buttery or serving-room, which is in one line, is 45 ft. long. All the principal parts of the cooking apparatus are shown on plan No. 3. As regards the fittings, we have consulted the engineers who advised us in the case of Emsayre College, and have shown the apparatus as arranged by them—they are acquainted with the dietary table used at the hospital and have calculated accordingly. The dinner railways run through the buttery or serving-lobby. The general arrangement of the offices, and their grouping with regard to the kitchen, result from our experience in other cases, and will be best understood from the plan.

The matron's and servants' dining-rooms are within easy reach of the kitchen, and the sleeping accommodation for the kitchen staff is above them.

The new court-room has been made of the same dimensions as the present room, so that the panelling and other ornamentation may be reused. There are other features of interest in the present hospital (doorways, statues, &c.) which would be refixed in suitable positions.

The place chosen for the head-master's house is, we think, the most convenient and the best. It is near the gate-house or main carriage entrance, and easily accessible from the houses and schools, and at the same time well placed for visitors coming from the new station.

The six houses are shown on the general block plan No. 1, drawn to the scale of the large ordnance map.

These are placed so as to be as near the great kitchen as may be, and there is also an access to them from the basement (see drawing No. 7).

The clock tower is in the centre of the east walk of the cloister; its lowest story forms the chief entrance to the central hall, and on speech days carriages would drive through the gate-house to the foot of it; the next story, or first floor, is used as an ante-room to the gallery of the hall. Above this is the clock-room—then the belfry, and, highest of all, a large cistern, higher above the ground than any of the roofs, so that the water would fill the cisterns in the houses by gravitation; the main pipes would go

up in one angle of the tower, as shown, and would be accessible (for repair) through their whole height.

The drawing school is on the first floor, self-contained and with north light. . . .

We should wish to use, as far as may be, local materials, and therefore suggest that the external walling generally should be of Stammerham stone, hammer-dressed, and the dressings of sandstone from Aldridge's pit or from other suitable sources of supply in the neighbourhood. This, however, need not necessarily apply to the infirmary, sanatorium, and doctor's house, which might be of red brick with stone dressings, and we propose that the 'officers' houses shall in any case be thus treated.

The walls of all dormitories, class-rooms and other residential buildings to be hollow, the outer thickness of stone and the inner of brick, with a cavity of 3 or 4 in. between the two thicknesses, tied together with bonding ties.

A bed of concrete 6 in. thick to be laid over the whole area of each block of building. In all residential buildings, class-rooms, and houses, the floors and ceilings to be of Fawcett's patent fireproof construction, so that the possible injury by fire would be very limited.

All internal walls to be plastered, with a cement dado in sitting and living-rooms.

Corridors and passages to be paved, or of concrete; the cloister and similar portions might be paved with the local stone paving.

The floors of day-rooms, dormitories, and living-rooms to be of 1½ in. yellow deal, ploughed and tongued on battens let into top surface of concrete of fire-proof floor.

Roofs to be covered with tiles or lead as the pitch may require.

Windows generally to be glazed in metal frames, with patent casements opening as doors in the lower half, and in the upper portions hinged at the bottom and falling inward.

The doors to be of oak.

The internal woodwork of the roofs of hall, dining-hall, ante-hall, and cloister to be of oak, and also the wainscoting and floors of the halls and court-room.

The warming will be effected by steam. Three boilers to be placed where shown, with sufficient space for a spare one.

A 7-in. steam pipe to be taken from the boilers, in a brick channel below the ground, of sufficient size for a man to enter for examination or repairs, with manholes at intervals.

The steam pipe to be taken round the subway below the cloisters (see drawing No. 11), with branches to hot-water heaters, two to each 'house' block, being one for warming (only required in the winter), and one for hot-water service, which will be in use throughout the year.

This system applies to the seven boys' houses for heating and hot-water supply, and to the masters' houses for heating only, as the hot-water supply for the latter will be obtained from the kitchen range in each house. The condensed water from the waste steam to be returned to the boiler-house and used for feeding boilers, with pumping apparatus to suit.

Special hot-water heaters to be provided for the junior school and the masters' houses, also for the chapel and ante-chapel, dining-hall, and court-room, central hall and adjoining blocks.

The swimming bath, scienceschool, and gymnasium to be warmed by hot-water heaters, to which steam will be taken from the general steam boilers.

Hot-water radiators to be placed in the various positions shown on plan No. 1, the larger buildings, such as the chapel, dining-hall, &c., will be heated by hot-water pipes below the floors with gratings.

Fresh air supplies to be taken to all heating pipes and radiators with regulating valves.

The whole of the heating and hot-water supplies to be arranged in sections, with valves to each to close off or work any section separately as may be required.

## Correspondence.

To the Editor of THE BUILDER.

### COMMISSIONS TO ARCHITECTS.

SIR,—Since my last letter on this subject I have seen Mr. Ching, who assures me that the discount quoted in his circular was not intended to convey any offer of a commission to architects for introducing his wares to their employers. He assures me that he has never allowed any commissions to architects, and should never think of doing so.

I, of course, accept and believe his assurance, and do so with pleasure, and can only regret that his circular should have been so incautiously worded as to bear the meaning I put upon it. I have recommended him to word it differently in future. Probably, most architects would have understood it as I did, it being well known that many architects do take illicit commissions, a practice which cannot be too soon exposed and rendered impossible. Mr. Ching himself admits

that architects have from time to time asked him for commissions, though he has very properly refused to listen to them. If manufacturers who desire to conduct their business on straightforward principles would always act in this way they might soon relieve themselves from the blackmail too often levied on them by those who are a disgrace to our craft.

THOMAS G. JACKSON.

SIR,—We note in your remarks in last week's *Builder* you state that your interview was with Mr. Ching; we beg to inform you that it was with the present senior partner of the firm—Mr. Samuel Chitty—who was the acting junior partner for many years before Mr. Ching's death in 1890.

COMYN CHING & CO.

\* \* The name of "Ching" was sent in to us when Mr. Chitty called, consequently we supposed we were conversing with a gentleman of that name. Mr. Jackson seems to have made the same mistake, no doubt from the same cause.—ED.

### FALLACIES AND FREEHOLDS.

SIR,—There was a time when, if a man bought a bit of freehold property in England, it was his own, and if it, being rated and assessed at, say, 100l. per year, was let to him on a repairing lease at, say, 50l. per year, on condition that the tenant should "uphold, maintain, and keep in repair," he was, at least, sure of his 50l. during the currency of the lease. But it is not so any longer, for the law, as administered by the Justices of the Borough of Margate last week, in the case of "The Mayor, &c., &c. v. Year," is that if the sanitary apparatus is damaged, say, by frost or otherwise, the occupier may move the Sanitary Authority to summon the owner, under the Public Health Act, to repair or replace the damage, and the justices may not even look at the lease, but must convict the owner should it be his fortune (or misfortune) to be the party summoned, as the Act of Parliament makes it optional for the Sanitary Authority to summon either "the owner or occupier" for nuisance existing on any premises. Members of our profession and lessors of property generally should have their attention seriously called to this extraordinary decision.

I am not complaining against my judges, nor saying one rebellious word against the law, but the idea that a repairing lease, as it is called, throws the sanitary maintenance and repair of a property upon the occupier, must henceforth be considered a fallacy to which freeholders may receive a rude awakening.

It is not our rule to comment editorially on a legal decision without full knowledge of all the facts. We may, however, point out that the policy of Parliament, and a very proper policy it is, is to make certain that sanitary repairs shall be done. Has our correspondent consulted his solicitor as to his right over against the lessee in respect of the matter under the lease?—ED.

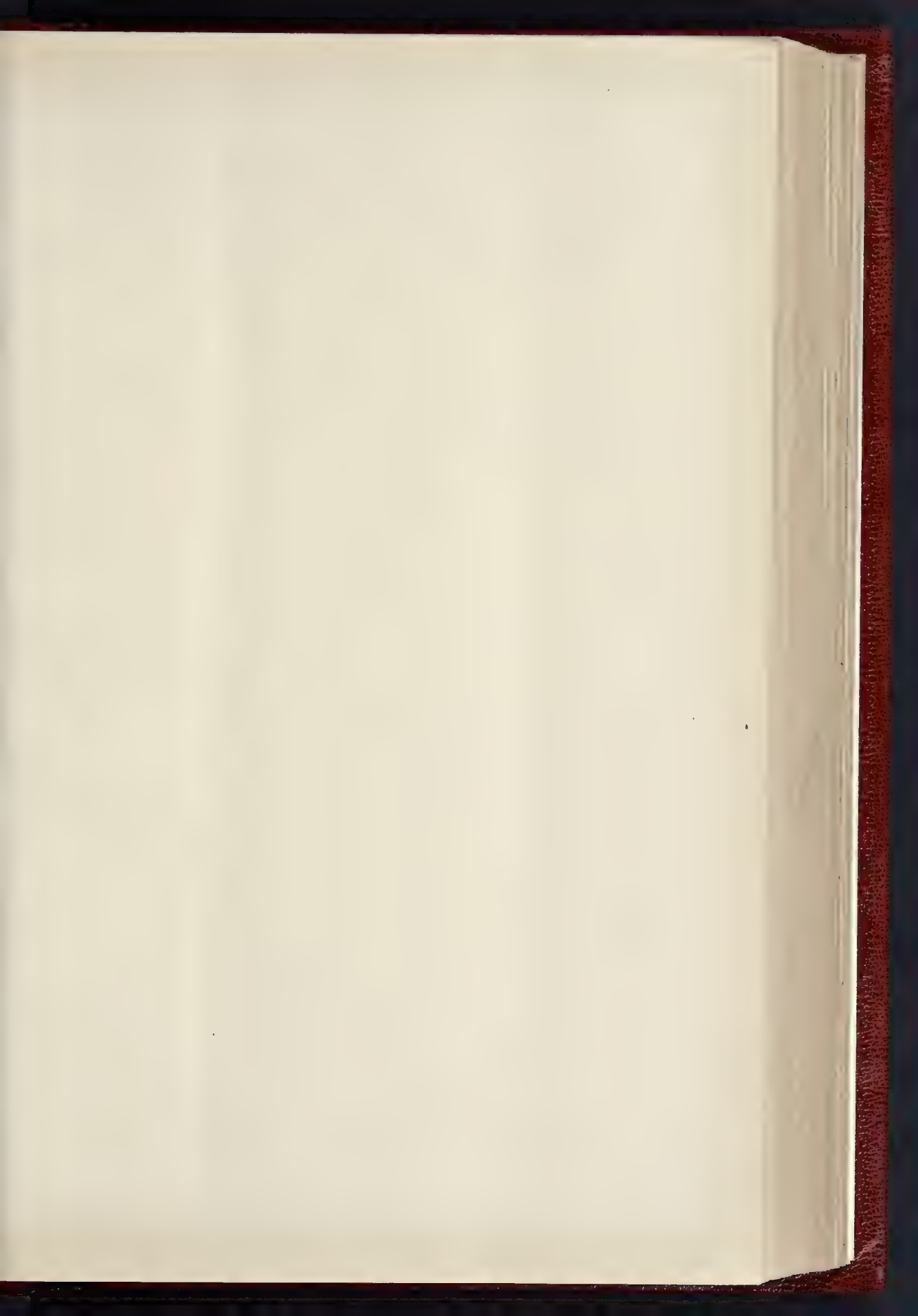
### SEWER AND DRAIN VENTILATION.

SIR,—May I be permitted to revert to Mr. Read's letter on page 507 of your issue of the 20th ult. That gentleman, with other engineers, whose numbers appear to be on the increase, advocates "free ventilation" of sewers, but I fail to see from any part of his letter what advantage is supposed to be derived from that method of sewer ventilation.

I observe that he considers it of the first importance that the sewer air should be reduced to a certain standard of quality before free ventilation is granted, and that to obtain such a standard the best possible gradients must be adopted. I respectfully submit that if the principle of free ventilation is dependent on good gradients, it is one that, to say the least, cannot have a general application, for engineers well know that the "best possible" are too often very bad gradients. Will Mr. Read kindly point out what we gain by "free ventilation"? We discharge into our sewers what is obnoxious in order to get rid of it as quickly and as completely as possible. To retain it would be offensive to sight and smell, and injurious to health, and if we dare do so, we should hermetically seal our sewage conduits so as absolutely to prevent any emanation whatever from escaping to pollute the atmosphere in which we live. Why do we not hermetically seal our sewers? Every one knows that the conditions under which sewers operate would at times force the contents through the water-seals which separate our dwellings from the sewer, unless some other escape were provided. Apart from the necessity of the special provision of fresh air in cases where sewers have to be entered for cleaning, &c., I venture to think that is the sole reason for providing such other escape for air, but for making good proof through the unexpected evil was created, and one which has proved far less easily cured.

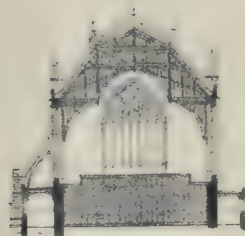
Difference of temperature within and without the sewer, and other causes, often drive the sewer air (directed to particular exits, according to the direction and force of the wind) at a much greater velocity through the openings than was bargained for. The ventilators themselves thereby become a nuisance and source of danger. The next effort of







FRONT OF THE ARCHWAY



FRONT OF THE ARCHWAY



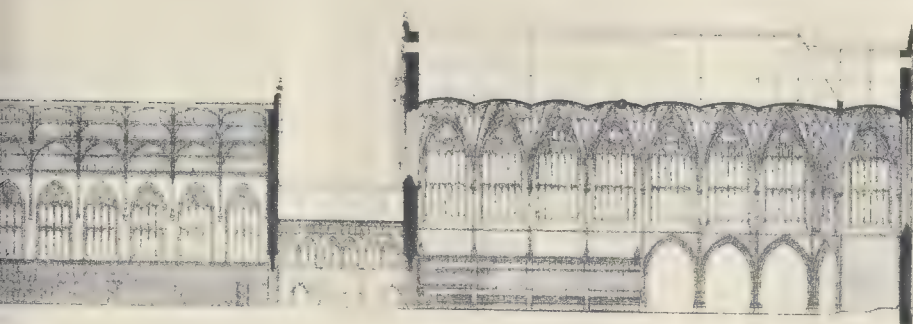
FRONT OF THE BUILDING

FRONT OF THE BUILDING





ELEVATION



WEST WALL      EAST WALL      NORTH WALL



WEST WALL      CHAPEL

PHOTO SPRAGUE & CO. 225 EAST HARDING STREET, PETER LANE, E.T.

TOOLS.—By MESSRS. CARPENTER & INGELW

IOUS BUILDINGS.







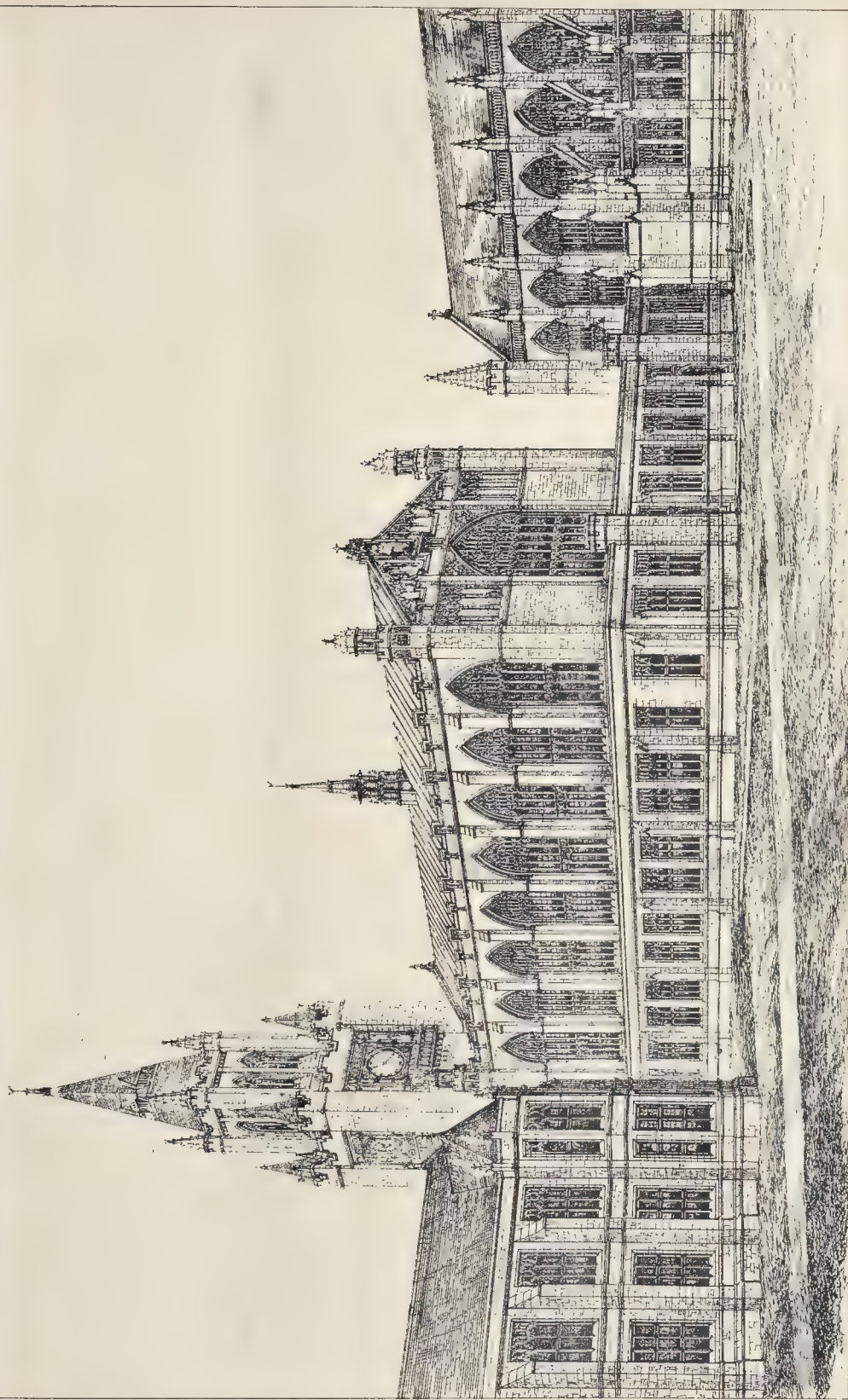
THE BUILDER JULY 28, 1894.



PHOTO. THE SPACCA & CO. EAST NATIONAL STREET, LONDON, E.C.

COMPETITION DESIGN FOR CHRIST'S HOSPITAL SCHOOLS.—BY MESSRS. CARPENTIER & INGLOW

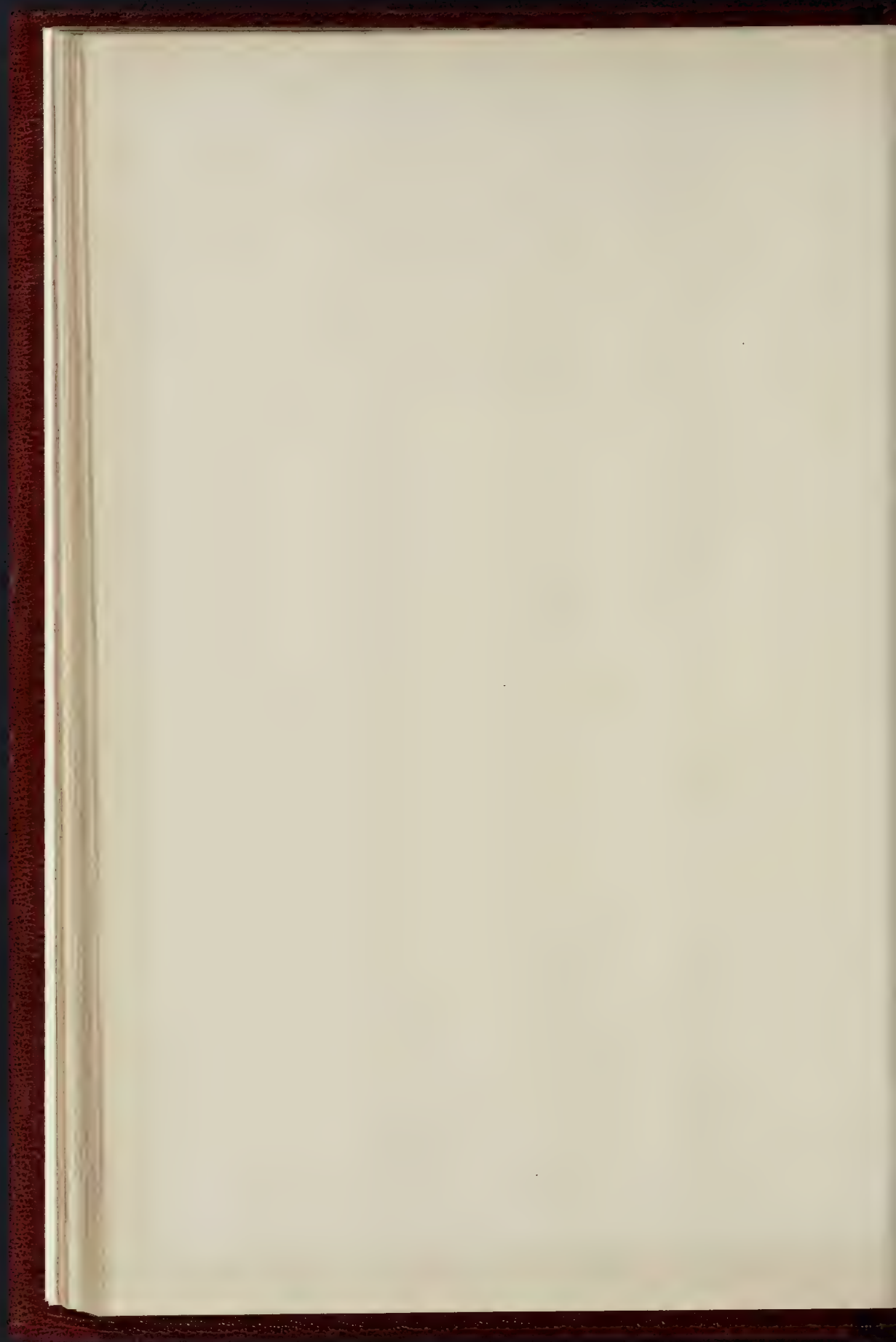




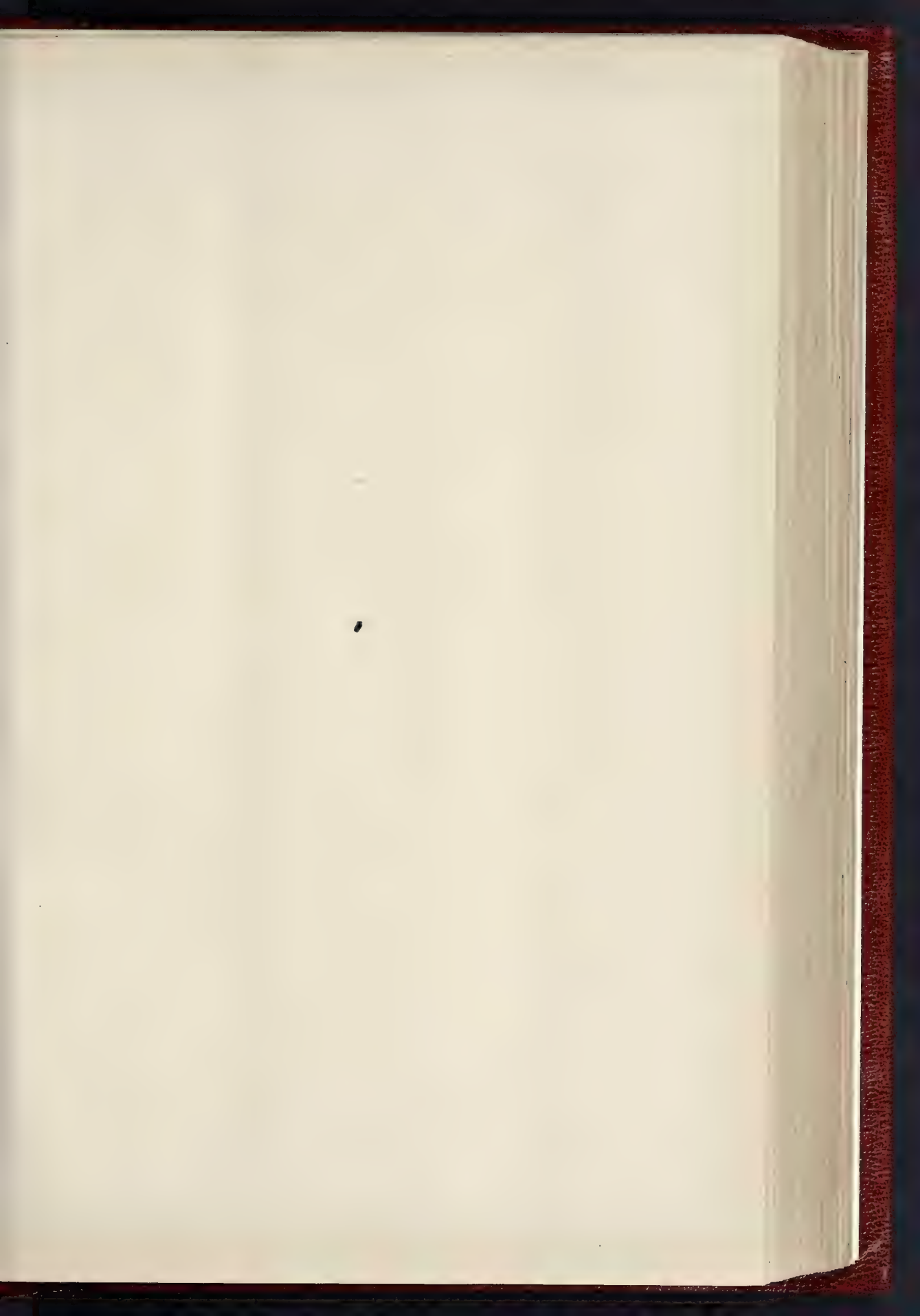
COMPETITION DESIGN FOR CHRIST'S HOSPITAL SCHOOLS.—By MESSRS. CARPENTER & INGELW.

VIEW OF HALL AND CLASS-ROOMS, WITH PART OF MUSEUM AND CHAPEL.

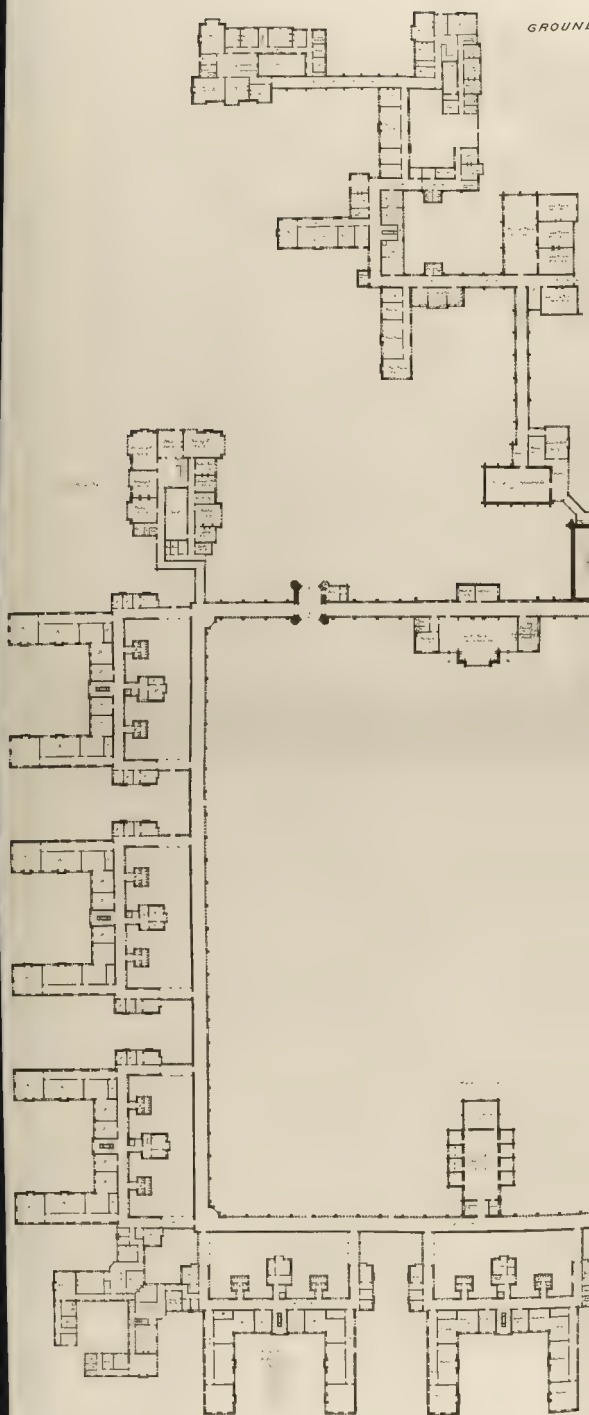
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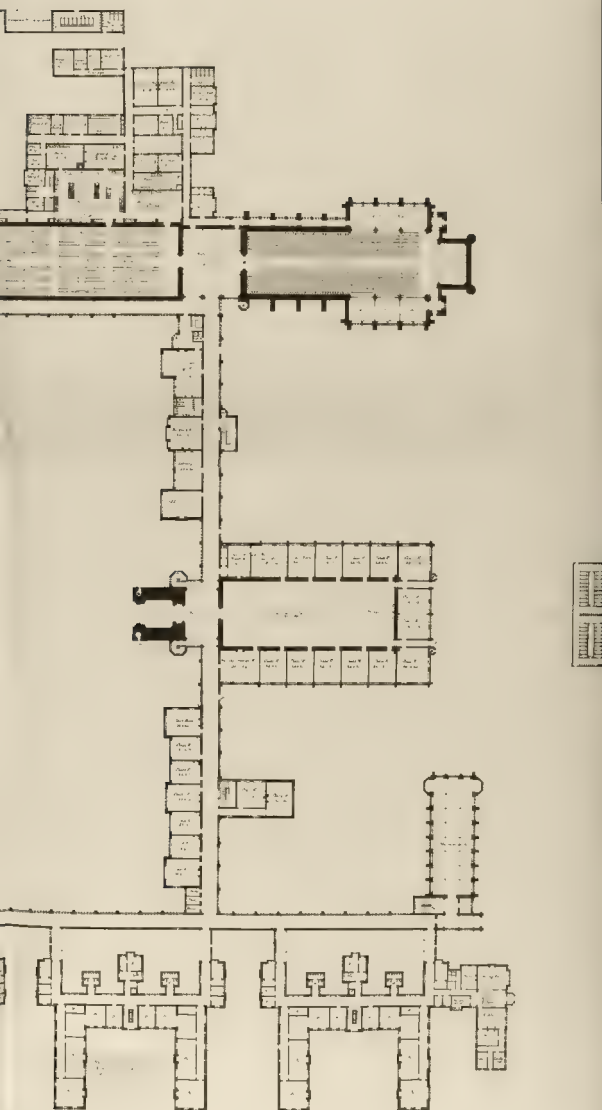


GROUND





## PLAN







engineers was directed to cure this evil. That effort has continued almost without intermission for the past forty years, and the discussion on the subject at the Association of Municipal Engineers is a witness with what little success, not to speak of the letters of complaints which are constantly appearing in newspapers from persons who are unfortunately enough to reside near them.

I will not attempt to enumerate the legion of remedies which have been tried, but the one which strikes me as the most curious of all is that which assumes that the more offensive the ventilators the more you should increase their number, and the less it will harm you. If a ventilator smells very badly, put in another. If that is objectionable, add a third, and so on, supposing that if there be three, each one will only be one-third as offensive as if there were one only, forgetting that two of them may serve as inlets for the wind to concentrate a more violent current than ever upon the third.

What would appear to be the common-sense remedy is, that since the sewers are constructed for the purpose of receiving and conveying away the filth which is offensive and injurious to health, we should allow no more of its contents to pass therefrom than is necessary to secure perfect safety to the seals which are provided for separating the house from the sewer. This can be done perfectly by a simple layer of cotton-wool. The law under which I will pass through such a filter differs from that through a clear opening. In the latter case the velocity varies as the square root of the pressure, while in the former case it varies directly as the pressure. The effect of this difference is, that with minute pressure such as is usual in sewers under normal conditions, say  $\frac{1}{100}$  of an inch of water, the flow through the filter is very slow; but with a sudden rise, for instance, in the volume of sewage requiring rapid exit of the contained air, the velocity increases enormously more rapidly in proportion to the pressure than is the case with a clear opening. Take, for example, two openings, one clear and the other provided with a cotton-wool filter, such that they would transmit an equal volume of air in equal time with  $\frac{1}{100}$ -in. pressure, then in order for each to discharge air with twenty times the original velocity, the pressure would only have to be increased twenty times for the filter, that is, to  $\frac{2}{100}$  of an inch, but with the clear opening it would have to be increased 400 times, that is to 2 in., which would be sufficient to force many of the water-seals. Besides, however, operating as a check upon the useless and injurious wind currents in the sewer, the cotton-wool acts as a perfect germ-arrestor, thus purifying from its most dangerous element the comparatively small quantity of sewer air which it is necessary to discharge into the atmosphere. I believe the importance of this filtration of air cannot be over-estimated. Many cases have come within my experience where disease has undoubtedly been contracted by emanations from sewer ventilators, and no stronger evidence need be required than that afforded by the Medical Officer of Health of Fulham, reported in the *Surveyor* of the 28th ult. He says that of 231 cases of diphtheria no less than 96 occurred in houses situated within 10 yds. of sewer-ventilator, although curiously enough, the only remedy Dr. Jackson sees is to increase the number of houses which shall be in actual contact with the ventilator, by placing them, having their outlets elevated so as to be in greater proximity to the sleeping apartments, where, perhaps more than in any other part of the house, infection is likely to be communicated.

The objection to the use of cotton-wool as a sewer air-trap in its liability to become clogged from the condensation of moisture from the warm sewer air, especially during the winter time; but that difficulty has been entirely overcome by an arrangement which utilises the very heat which caused the trouble, to prevent it. The filtering material is thereby preserved dry under any extremes of temperature.

THOMAS CAIRN,  
City Engineer.  
Guthall, Worcester,  
July 14, 1894.

P.S.—Since writing this letter my attention has been drawn to a report by Dr. F. W. Clark, Medical Officer of Health of Lowestoft, which corroborates the views expressed by Dr. Jackson upon the relation of diphtheria to sewer ventilator gratings. Dr. Clark recommends a less dangerous method of sewer ventilation and maintains that the less the movement of the air of sewers the less will the disease germs be carried into the outer air, and contends that one of the greatest faults of the modern system of ventilation is the creation of draughts throughout the length of our sewers. In this view I entirely concur, and the report embodies precisely the considerations which have induced me to adopt the system of ventilation through cotton-wool filters, referred to in the foregoing letter.

T. C.

SIR,—I am afraid we are as distant as ever from an agreement on this point. Many of our pet theories have had to be abandoned. Soil-pipes are being reduced to  $\frac{3}{4}$  in., house-drains to  $\frac{1}{2}$  in., the old valve closet is again coming into fashion. We were told that sewer-air always travelled in the opposite direction to the flow of the liquid; we

are now told that it travels with the flow. One professor tells us that the ventilation-pipes should equal the superficial area of the cross section of the sewer, another, that an inch pipe is sufficient.

Bristol, with sewers unventilated and very little water used for flushing, is a healthier town than Leeds, where ventilation and flushing is extensively adopted. Surely this points to the necessity of exhaustive experiments being necessary, not with tow and clay, as we are told was done at the Sanitary Institute flushing cistern experiments, but in existing sewers, and by a Government Department. The remedy seems to be in some means of powerful extraction from the sewers at their outfall, and the pulling down of all the extraction-shafts. As theory seems unsettled, let us fall back on practice. I have stood under a slate roof and smelt the sewer-air discharged from ventilators of pipes blown through the joints of slates.

I have a disconnecting trap (Doulton's No. 31), I have carefully watched for eight years, and it has never required clearing. I have gauged it many times, and never found the deposit your correspondent mentions. I have had fifty of these traps in use at one building for many years, and never had any trouble with them; occasionally one may choke, but they are easily cleared by unskilled men. At one building there was no disconnecting trap. A scullery in the basement had a sink, with waste-pipe connected with the drain trapped. This was not used for some time, the water-seal evaporated, the sewer-gas entered the house, typhoid broke out, and one man died. A disconnecting trap would have prevented this. Under these circumstances I shall still use a disconnecting trap.

ROBERT PHILLIPS,  
County Surveyor, Gloucester.

SIR,—In vol. xv, part ii., of the *Journal* of the Sanitary Institute just issued, there is a paper (page 264) by Colonel C. E. Waring, M.Inst.C.E., in which he states that the city of New Orleans, containing a population of 300,000, is about to be sewerized on what is known as "Waring's system." "All rain-water being rigidly excluded, and all sewers to be automatically flushed and ventilated through the soil-pipes of the houses," no trap being allowed on the main drain."

Colonel Waring was the engineer who carried out the sewerage of Memphis, U.S., about fifteen years ago. I think the passage above quoted will answer the question Mr. Read asked of me in his letter to the *Builder* of June 30.

But what will Mr. Buchan say?

RICHARD F. GRANTHAM,  
M.Inst.C.E.

SIR,—Mr. Read on page 26 states that the recommendation of medical men that the house should be isolated from "sewer and drain gas," was "very good advice." "But," he says, "the method of carrying this isolation into effect by means of the interceptor trap is bad."

Now, will he give us some better method? He has not yet done so. He relies on the water-trap of the closet as a sure safeguard against both sewer and drain gas, and then finds fault with sanitary engineers and doctors for recommending the same water-trap as a safeguard against the sewer itself! Mr. Read is not at all logical.

Mr. Read straggles the interceptor-trap on the drain as a legalised "rat-trap obstruction." He deserves a vote of thanks from the rats for thus supporting their right of way into the interior of the house. In houses where the closet traps are of lead the rats can easily eat a hole through the lead from the inside of the pipe, and did so one night in a house I was staying in. Then in a house shut up for a time, in which the soil-pipes are iron, and the traps of the closets earthenware, the rats could follow the air or sewer gas into the house when the water of the closet-traps had evaporated below the water-seal.

In the third paragraph of his letter on page 26, Mr. Read puts his foot into his own basket and breaks all his own eggs, when he says that the greater amount of air-space and the less liquid sewage in the sewer between midnight and 6 a.m. does not imply that more sewer-gas is generated then. The truth is that much more sewer-gas is generated there from the befoiled sides of the sewer exposed between midnight and 6 a.m., which are not exposed in the daytime. Further, when he tells us that from midnight till 6 a.m. the drain-air is being poisoned by the emanations from the three gallons of stagnant sewage in the interceptor-trap, we are entitled to ask, "What poisonous emanations?" Dr. Carmichael kept "poisonous" or germ-breeding matter in his traps for weeks, but no emanations could get out of said traps to harm the materials exposed only a few inches beyond the traps.

Glasgow, July 14, 1894. W. P. BUCHAN.

SIR,—The careful and elaborate experiments which have been made during the past few years by several eminent authorities give conclusive evidence:

\* This is not very clear. We presume the soil-pipes of houses have nothing to do with the automatic flushing, but the sentence certainly reads as if they had.—Ed.

that sewers can only be ventilated by frequent openings, certainly not more than 100 yds. apart, and closer where possible. There appears to be no doubt about this, as attempts to force or exhaust air through long lengths of sewers distinctly failed. The difficulty is to provide these openings, and yet ensure that no nuisance or danger shall arise from them. Some such arrangement as that shown in the sketch by Mr. Baker, published in the *Builder* for July 14 is probably in the right direction but, whatever means are adopted, the ventilation of the sewer must be distinct from that of house-drains. Personally, I do not see the necessity or desirability for such ventilation at each house in streets where the property is small and the houses close together, but would adopt, as I am doing in works now being designed by me, air-shafts at intervals and at dead ends of sewers of sufficient size to ventilate the sewer they are connected with.

With regard to Mr. Baker's sketch I would point out that the junction of air inlet with sewer would frequently be covered by sewage and the inlet ventilator stopped.

The shafts I have referred to could be built against house walls without causing any disfigurement or unduly asserting their object—which has been done at Wimbledon and other places. I should prefer them built in brick or in some fairly non-conducting material so that an equable temperature would be maintained and a constant up-draught secured.

Inlets would be provided at points between the outlets, and would enter the sewer at the crown, so as to be always uncovered. The inlet shafts should be the same size as the outlets, and would be taken to the side of the road, so as not to be stopped up by mud, &c. It must be borne in mind that the direction of these inlet air drains is upwards, and consequently there is a tendency for sewer air to rise in them, but if the outlets are properly placed and built in non-conducting material, I do not think there would be much likelihood of the air inlets becoming sewer gas outlets.

Mr. Read, as a practical engineer, cannot expect to make much impression on practical men with his arguments against the interceptor.

The real question is, Is it desirable to intercept house-drains from public sewers? Most unbiased authorities will answer this in the affirmative, and that being admitted, then the obstruction to the sewage flow offered by an interceptor—which, with one designed on scientific lines, is practically inappreciable—is of no weight compared to the advantage it affords. And the emanations from the "three gallons of stagnant sewage" contained therein would not, I take it, prove so dangerous as air from the sewer, although as Mr. Read states "between 12, midnight, and 6 a.m. . . . the sewage consists chiefly of water wasting through rubbishy fittings." If that is so, would not the off-odour water have had to flush out the "stagnant sewage" from the interceptor before it could reach the sewer?

HARRY GEO. ASSITER.

## LLANDUDNO MUNICIPAL BUILDINGS COMPETITION.

SIR,—In answer to "A Competitor's" letter in your to-day's issue on the above subject I beg to give the information asked for. One hundred-and-eighty-one forms of particulars were sent out, and thirty-three sets of designs were received.

A Committee Meeting was called, and met on June 22 and discussed the names of three gentlemen as assessors, but came to no conclusion. A further Committee was called on July 6, and the name of one of these gentlemen was selected for recommendation to the Board. The Board met on July 18, and I regret to say have referred the matter back for further consideration.

The three names placed before the Committee were given to me at my request by the President of the Royal Institute of British Architects, but as the Llandudno Improvement Commissioners have not yet decided upon the assessor, and, further, are somewhat divided as to the fee they are of opinion they ought to give, I am not at liberty to mention their names.

May I add that personally it has been and is my desire to see that the competition is conducted strictly fairly throughout, and that an assessor should be appointed who would be acceptable to all.

Commissioners' Offices, E. P. STEPHENSON,  
Llandudno. A.M Inst.C.E.  
July 21, 1894.

## COLOURED SCULPTURE.

SIR,—I observe that in the *Builder* for the 14th inst., you notice the article on "Coloured Sculpture," by Mr. George Frampton, in the June *Studio*. Since a suggestion you particularise in it is a doubtful one, I cannot let an artist be saddled with it, who very decidedly has the totality of gifts which make a sculptor.

I beg you therefore for the sake of the distinguished Associate to note that this suggestion, with all its questionableness, is not his, but that of—Yours faithfully,

MATTHEW WEBB.

\* \* \* We did not observe that there were two authorships under the same heading; and of course we did not take it that Mr. Frampton was referred to as one who had not "the totality of gifts."—Ed.



## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—IV.

LAND VALUATION, RIPARIAN RIGHTS, EASEMENTS, AND COMPENSATION—(continued).

#### Riparian Rights and Compensation.

**T**HE proprietor of any land adjoining or abutting on a stream has certain privileges or rights known as "riparian" (Lat. *ripa*=a bank).

The law relating to these rights has been, from time to time, set forth in many well-known cases, to some of which further reference will be made.

In accordance with English law, the property in water flowing in a river or stream in its natural course belongs to no one, but the use of it to everyone having a right of access to it.

In *Minor v. Gilmour*, Lord Kingsdown observed as follows:—"By the general law applicable to running streams, every riparian proprietor has a right to what may be called the ordinary use of the water flowing past his land—for instance, the reasonable use of the water for his domestic purposes, and for his cattle, and this without regard to the effect which such use may have in case of deficiency upon proprietors lower down the stream. But, further, he has a right to the use of it for any purpose, or what may be deemed the extraordinary use of it, provided that he does not thereby interfere with the rights of other proprietors, either above or below him. Subject to this condition, he may dam up for the purpose of a mill, or divert the water for the purpose of irrigation; but he has no right to interrupt the regular flow of the stream, if he thereby interferes with the lawful use of the water by other proprietors, and inflicts upon them a sensible injury."

In the case of *Chasmore v. Richards*, it was held that "The right to the enjoyment of a natural stream of water on the surface belongs *naturali jure* to the proprietor of the adjoining land as a natural incidence to the right to the soil itself. He has the right to have it come to him in its natural state, in flow, quantity, and quality, and to go from him without obstruction, upon the same principle that he is entitled to the support of his neighbour's soil for his own in its natural state. And such a right depends in no way upon prescription, or the presumed grant of his neighbour, nor from the presumed acquiescence of the proprietors above and below."

Again, in *Mason v. Hill*, "A riparian proprietor can have no larger right than he has by nature against those above and below him. Hence the right to have a stream to flow in its natural state without diminution or alteration is an incident to the property in the land through which it passes; but flowing water is *publici iuris*, not in the sense that it is a *bonum vacans*, to which the first occupant may acquire an exclusive right, but that it is public and common in this sense only, that all may reasonably use it who have a right of access to it; that none can have any property in the water itself, except in the particular portion which he may choose to abstract from the stream and take into his possession, and that during the time of his possession only."

If, then, a Local Sanitary Authority, or generally the promoters of a water supply scheme, desire to utilise any spring or stream of water for that purpose, they must first come to terms with the owner of the land whereon the spring rises, or the riparian owner of that part of the stream from which they wish to take their supply. As such owner can only grant the limited powers which he himself possesses, terms must then be arranged with all the riparian owners lower down the stream who have appropriated, or may appropriate, the water to a beneficial use. Such arrangements must be made in writing.

"If any works are proposed to be done affecting any water or water rights the proper course to be observed by a Local Authority is to serve a notice under the 328th section of the Public Health Act, 1875, on all persons interested, specifying the particulars of the matters and things intended to be done. Then will follow, either the consent of the parties interested, or there will be a reference to arbitration, and then will follow, either compensation for injury, if the injury can be compensated in money, or an abandonment of the proposed works." There is recourse to the promotion of a private Bill in Parliament, but this is too expensive, except in the case of very large schemes.

Water rights require to be very carefully dealt with, and every detail should be settled before the works are commenced.

In the first instance the quantity of water should be gauged, by methods to be described in a later paper, the fall of the stream ascertained, and a careful investigation made of the use to which the water is put below the point of the proposed intake. The quantity of water required by any mills or other machinery worked by the stream should be obtained, as well as the quantity used for domestic, dairy, and other purposes.

The head waters of a stream are usually required for the purposes of waterworks when storage is necessary. It therefore becomes a matter for serious consideration whether such abstraction, either wholly or partially, will deprive the riparian owners below the site of the proposed works of sufficient water for the purposes of fishing, irrigation, mills, factories, boundary fences, and other matters. The compensation in such cases is either given in kind or in money. The quantity in the former case varies from one-third to one-tenth of the available annual yield of the gathering ground, necessitating in numerous cases the construction of "compensation reservoirs." The object of these reservoirs is to store the flood-water, so as to maintain a continuous or intermittent flow, as may be arranged or settled by Provisional Order or Act of Parliament. When the proprietors are disposed to treat and are not numerous, it is better in most cases to purchase their rights and be relieved of a large proportion of the compensation water.

There is no property in underground water, and any proprietor may sink or dig wells and obtain water, even if by doing so the water in a neighbouring proprietor's well is abstracted or diverted into another channel. In some cases wells are sunk to the spring supplying a stream, which by intercepting the spring at a lower point may considerably reduce the flow of water in the stream.

"But although a landowner will not in general be restrained from drawing off the subterranean waters in the adjoining land, yet he will be restrained, if, in so doing, he drains off the water flowing in a *defined surface channel* through the adjoining land." As an instance of the application of this principle, the following case is given. A large provincial water company recently promoted a Bill to enable them to sink wells at various points along a stream, and pump the water which percolated into them to a storage reservoir. The riparian owners and residents in the valley opposed the Bill with such success that the quantity of water to be allowed to flow in the stream before pumping could proceed was so great as to render the Act when passed useless to the water company.

Much of the above information has been extracted from the valuable legal works of Messrs. Michael & Will, and Messrs. W. C. & A. Glen, to whom thanks are due.

#### Easements and Compensation.

In laying the various mains and branches in connexion with a system of water supply it frequently becomes necessary to lay pipes or tunnel through private property. In cases where the purchase of the freehold of the land is not made obligatory, or desirable, an easement is obtained.

The term "easement" is defined in an ancient work called the "Terms de la Ley" as follows:—"An easement is a privilege that one neighbour hath of another by writing or prescription, without profit, as a way or sink through his land or such like."

An easement giving the right to lay pipes, build culverts, drive tunnels, &c., for the purpose of conveying water, implies a right of entry at all times for repairs or other purposes rendered necessary for its proper enjoyment. And, further, the person to whom the easement is granted may prevent the owner of the land from doing anything to interfere with such a right—as, for instance, building houses or planting trees over the line of easement, or otherwise placing any obstruction to the full and proper enjoyment by the purchaser thereof.

In the case of *Pomfret v. Ricroft*, Twysden, J., observed as follows:—"If a man gives me a licence to lay pipes of lead in his land to convey water to my cistern, I may afterwards enter and dig the land to mend the pipes, though the soil belongs to another and not to me." "Whoever grants a thing is supposed also tacitly to grant that without which the grant itself would be of no effect."

In the case of "Goodheart v. Hyett," the owner of the land commenced building over the line of easement, and the owner of the easement sought to restrain him from doing so, on the ground that if the house was built it would be impossible, or

not reasonably practicable, for the owner of the easement to have access to the pipe for repairs. The Court restrained the owner of the land from building over the line of easement.

In taking into consideration the compensation due to the owner of the land, the elements of claim for damage may be classified as follows:—

1.—The privilege of carrying a certain thing, either continuously or intermittently, over or under the land to the profit of the purchaser.

2.—The right of entry to pipe or culvert at any time.

3.—The right of preventing any buildings or other obstructions being erected or built on the line of easement.

4.—The interference with the profitable laying out of the land for building sites or otherwise.

5.—The driving of the tunnel or excavation of the trench may have the effect of withdrawing the moisture from the crops, and thus depreciate the value of the land for agricultural purposes. On the other hand it may be of great benefit where the land is marshy or water-logged.

6.—The driving of the tunnel or excavation of the trench may intercept or divert underground water which previously had risen on other portions of the land.

The methods adopted by experts, and the results arrived at, differ so materially as to render it impossible to give any common data upon which the valuation is based. This is chiefly due to the variety of opinions held as to what constitute the elements of damage, even on adjoining land when precisely the same conditions prevail.

The following are, however, a few of the methods adopted by experienced valuers:—

1.—The length of the easement in yards is multiplied successively by 33 ft., the value per acre, and thirty years' purchase.

2.—The length of the easement in yards is multiplied successively by 4 yds., the value per acre, and from forty to fifty years' purchase, and the result divided equally between the two parties to the easement.

3.—The length of the easement in yards is multiplied by 8 yds., and then by half the value of the fee simple.

To the results arrived at by any of the above methods a fixed price must be added for ventilating shafts, air-valve standards, or other surface arrangements, varying from 5s. to 6l. each.

The widths taken for the easement for the purposes of valuation are somewhat elastic, varying from 6 ft. to 66 ft. For pipes or culverts up to 2 ft. diameter the width is frequently taken as 12 ft.; for larger culverts the width taken generally varies from 12 ft. to 33 ft.

The average price is taken by some valuers at 3l. per chain lineal, irrespective of width. Other valuers taken from 3l. to 2s. per lineal yard for agricultural land, and from 5s. to 6l. per lineal yard for building land, as the average price throughout the length of the easement.

A Local Authority has full powers as to laying pipes, &c., along the highways under its control within its own district. With regard to highways outside its district, should any persons having the care of such highways object in writing, pipes must not be laid without the consent of the Local Government Board. The easement is usually granted conditionally upon the undertakers reinstating the road and keeping it in repair for one year after the completion of the work to the satisfaction of the Authority granting the easement. In some cases the Authority agree to accept a fixed sum per mile, relieving the undertakers from any further liability.

#### GENERAL BUILDING NEWS.

**RESTORATION OF CHURCH, COLD ASHTON.**—The church of the Holy Trinity, Cold Ashton, Gloucestershire, was reopened after partial restoration, on the 19th inst. The church, excepting the chancel, seems to have been rebuilt by Thomas Keys, a former Rector, 1510 to 1530 A.D., and to have undergone but little subsequent alteration. The works, so far as at present completed, comprise entire renovation of the chancel-roof, repairs to nave and aisle-roof, and new lead throughout; complete drainage of the subsoil; new step paving; boarded floors to seats; heating apparatus; repairs to east-end masonry; reopening of the west arch into the tower. Pennant stone has been largely used inside; Cornish marble and Ceramic mosaic for the chancel and sacrum. Some of the new English oak seats are fixed. These were made by Mr. R. Morris Ditchingham, Messrs. Hayward & Wooster, or Bath, were the general contractors; Mr. W. Orchard, Cold Ashton, having previously executed the chancel-roof. The brass lectern altar rails and lamps were supplied by Messrs. Wippell & Co. An interesting feature in the church is a carved



oak fronted pulpit, the pulpit itself lying within the north wall. It has a lofty stone canopy, with crockets and finials. Latimer is said to have preached from this pulpit. It was restored many years since by the late Rector of the parish. The new oak seats are of massive design, the end square framed with moulded cappings, and recessed panels with tracery fillings. The font has been moved to a position near the south door, and a west gallery (erected some time early in the present century) cleared away. An organ has been presented by Miss Ward, a lady who has otherwise assisted the work. It is a divided bracket organ, the bellows being in the upper part of the vestry, the organ-blower standing in a gallery erected for the purpose. It forms a decorative feature in the chancel, and illustrates the usefulness of this method of dealing with organs in small parish churches. The expense of an "organ chamber" is saved, and an architectural decoration gained at the same time. Mr. Augustus Frere, of London, is the architect responsible for the work.

**STABLES FOR THE QUEEN REGENT OF SPAIN.**—Extensive stables have recently been built for the Queen of Spain, at the summer palace of Miramar, San Sebastian. They are divided into two main wings, one for horses, the other for the large mules used in the royal carriages; there are about fifty stalls and boxes in all, and a central building with accommodation for about eighty men (coachmen, grooms, helpers, &c.) The stable divisions are of wrought-iron, with open panels, except at the upper ends near the mangers, where they are solid. Draw-out bars are furnished to divide off the animals entirely at night, in case of any breaking loose. The walls are tiled above the level of the mangers, with tiles of a willow-green shade (selected for coolness of aspect), and a copious supply of air is given by a ventilator above each horse's head. Vitiated air is carried off by a large outlet ventilator in the roof, and for very hot weather an extra provision is made by an inlet for fresh air below each manger. Special racks, nearly solid, have been made for the class of fodder used in the country (chopped barley, straw, &c.) The harness and saddle-rooms are in a central position, between the horses' and mules' stables. The haylofts are placed above the stables, so as to minimise the effect of external changes of temperature. The work has been carried out under an English architect, Mr. Wornum, and the stable fittings are by an English firm, Messrs. Musgrave, who have introduced all their improvements in stable drainage, fittings, ventilators, &c.

**MISSION HALL AND SCHOOL, EDGEHILL, LIVERPOOL.**—The laying of the memorial stone of the new church mission-room and school in Uxbridge-street, in connexion with St. Catherine's Church, Edgehill, took place on the 19th inst. The entire cost of erecting the building will be 4,000l. The school being for girls and infants, cookery and other classrooms will be provided. The mission-hall above will be 51 ft. long by 41 ft. wide, and will be approached by two stone staircases at either end of the front of the building. A second room will be provided on the same floor as the mission-hall for committee meetings, mothers' meetings, &c. The building is to be constructed of local brick, with J. Edwards's radial facings, while there will be a glazed brick dado round the school-room and class-rooms. The architect is Messrs. Arthur Baker and Harold Hughes, of London and Bangor, and on their behalf Mr. W. L. Tiffin will supervise the carrying out of the work of construction. The builders are Messrs. Brown & Backhouse.

**PROPOSED RECONSTRUCTION OF THE EDINBURGH CITY CHAMBERS.**—It is proposed to reconstruct the Edinburgh City Chambers, and the Dean of Guild Miller, in conjunction with Mr. Morham, City Architect, has had prepared a series of elevations and plans, showing in a tentative way their views as to what might be done with the present buildings were an extension and reconstruction of them resolved upon. An elevation has been made of the back of the lofty tenement, showing how it might be made more decorative, so as to give it a better appearance when seen from Princes-street. To this end it is proposed to build out a wing on its higher side to the line of Cockburn-street, and also about the point of the present stair leading from Cockburn-street to the Royal Exchange, a large square tower carried a story above the roof, and finished with a mansard roof. The decorative tower is similar in style to that on the front of the building facing the Exchange. It is proposed to annex the large tenement on the west side of the Signet and the Heriot offices. Should it be all acquired, it would be pulled down, and on its site extending from the Exchange to Warriston-close, and with an outlook also to the north. Below it would be reconstructed a new Council Chamber, and a new Burgh Court-room. The new Council-room is shown about two-and-a-half times the size of the present chamber, with a gallery for the public and a reporters' gallery. The old Council Chambers would be converted into a Lord Provost's room, and other parts of the building would be so altered. The whole scheme is estimated at 200,000l.

**PRESBYTERIAN CHURCH, WALTON BRECK, NEAR LIVERPOOL.**—The foundation stone of the

new English Presbyterian Church in Walton Breck-road was laid on the 18th inst. by Mr. William Evans, J.P. The erection of the new church has been placed in the hands of Messrs. Hough & Filling, of Everton, who will work from the designs of Messrs. Owens & Sons, architects, Liverpool.

**NEW CHANCEL, LEXDEN CHURCH, ESSEX.**—On the 19th inst. the new chancel of Lexden Church was consecrated by the Bishop of the Diocese. The main portion of the chancel now completed consists of choir, sanctuary, north aisle, and ambulatory, beyond which still remains to be added a south aisle. Over the ambulatory is an organ-loft and ministers' gallery. The structural work has been carried out by Messrs. N. Saunders & Son, of Dedham, from designs furnished by Mr. J. C. Traylen, of Stamford. Mr. G. Spearman, of Lexden, has superintended the building as clerk of the works. The style is Early Perpendicular; it is built of the local flint-work, with box-stone dressings, and bands intermixed. In the east end the window is enriched with stone carving, both internally and externally. The window, which consists of ten lights divided by a transom, is filled with stained glass from the works of Messrs. Heaton, Butler, & Bayne, and illustrates the Crucifixion and other scenes of the Passion. The pavement of the choir and sanctuary is laid in marble, the steps are of Derbyshire polished marble, enriched with Devonshire red, Irish green, and Italian white. This is the work of Messrs. Martinghi & Gilbardie, of Milan, who have introduced some of their new mosaic. The interior of the east wall above the floor is formed of Bath stone and Alabaster, in alternate bands. The Holy Table and ratable are of dark English oak, carved. In the recess of the east window, and above the ratable is a hanging, designed and executed by Mr. William Morris.

**FEVER HOSPITAL, BLACKBURN.**—On Wednesday the Mayor of Blackburn opened the new Fever Hospital at Longshaw, Blackburn. The building occupies an area of 10½ acres, and the grounds are enclosed by a boundary wall, 6 ft. 6 in. high. On entering the gates of the institution, there is a porter's lodge. The out bathing-place stands opposite the lodge, and to the right of the entrance-gates. There are two waiting-rooms, a bath lavatory, &c. It is intended that it shall be used principally as the final disinfecting and changing place for patients. The Administrative Block is situated to the left of the main entrance, is three stories high, and contains accommodation for the medical officer, matron, and nurses, with sixteen bedrooms, baths, lavatories, and water-alls floors of this block. A detached portion of the Administrative Block, supply ward, &c. The kitchen, scullery, dairy, pantry, laundry, &c. The pavilions, two in number, consist of long, one-storied buildings, divided into two main wards by the nurses' room and scullery. The angles between floors, walls, and ceilings have been rounded off. All the floors are formed of oak blocks laid on 4 in. of concrete and 2 in. of cement. The Scarlet Fever Pavilion lies to the right of the Administrative Block, and contains the following wards—men's ward, 60 ft. long by 24 ft. wide, and affords accommodation for ten beds. The women's and children's ward is 84 ft. long by 24 ft. wide, and accommodates fourteen beds. There is a private ward to each of these containing one bed. The two main wards are separated by the nurses' room. Crossing the corridor, and immediately opposite the nurses' room, is the scullery and laundry. There is also an isolated reception ward and small ventilating engine-house at the entrance to this pavilion. Lavatories, bath-rooms, with movable baths and sprays, &c., are provided in both the men's and women's wards. A verandah has been erected on the west side. The Typhoid Fever Pavilion lies to the rear of the Administrative Block on the left hand, and provides accommodation for four beds in the men's ward, and six beds in the women's and children's ward. The two wards are separated partly by a corridor, and partly by the nurses' room. Full control over both wards can be obtained by means of windows placed in the nurses' room. A private ward, containing two beds, lies to the rear of the nurses' room. Lavatories, baths, scullery, linen and food stores, have been erected in suitable positions. The wards are heated by Manchester grates, placed in the centre of the floor. A verandah runs the length of the entire building on the west side. The Isolation Block is situated immediately to the left of the Administrative Block, and contains three single wards, with nurses' room and out-building containing bath, sink, &c. The ventilation of the Scarlet Fever Pavilion has been carried out by the Sturtevant Company, and combines heating with ventilation. Air is supplied to the building and withdrawn by means of two fans, worked by a four-horse-power engine. The air is heated before admission by means of steam pipes, around which it circulates. The air is also filtered, and can, when necessary, be moistened, and to a certain extent cooled. This air is admitted at a height of 10 ft., and the outlets are placed close to the floors under ware pipes to the laundry chimney. The ventilating pipes are of glazed earthenware, and are so arranged that they can be cleaned. The ventilation of the other parts of the hospital is carried on by fireplaces,

ventilating stoves, ventilating gas-lights, and Boyle's patent ventilators. The Laundry lies to the extreme south of the site, and contains patients' laundry engine-house, staff laundry, boiler-house, and chimney 90 ft. high. The patients' laundry is entirely cut off from the staff laundry. The Disinfectory, Stabling, and Mortuary Block faces Longshaw-lane, to the west of the site. The disinfectory occupies a building 24 ft. long by 12 ft. wide, and has two entrances. The grounds of the hospital are drained by means of surface or tile drains. The sewage from the hospital is discharged from the various buildings into earthenware pipes, and with an inclination of 1 in. in 60 ft., falls to the extreme north-west side of the site. There it joins the main sewer. Manholes are placed at intervals of 200 ft. These are built of salt-glazed bricks, with blue brick inverts, and are accessible by means of a cast-iron manhole cover, on hinges. A perforated grate is also placed on every manhole for ventilation. All drains, before entering any building, are disconnected by means of Buchan's Disconnecting Traps, built into manholes. The soil-pipes from the various closets are ventilated by means of cast-iron pipes carried up the walls to about 3 ft. above the eaves of the roofs. Water-closets, sinks, and hoppers have been supplied by Messrs. Doulton & Co., of Lambeth, and Messrs. Twyford & Co., of Hanley. All outside walls are formed of bricks, with Yorkshire stone dressings. All walls, ceilings, coves, &c., have been plastered and finished with patent adamant plaster, supplied by the Patent Adamant Company, Limited, of Birmingham. The plans for the hospital were prepared and carried out by the staff of the Borough Engineer (Mr. J. B. McCallum, M. Inst. C.E.), with the medical assistance in the first instance of Dr. S. Barwise, and secondly, by Dr. J. Wheatley, M.O.H., of the County Borough of Blackburn. The chief contractors were—for masonry and brickwork, J. Whittaker; for joinery, Kenyon & Moulding; for plumbing, E. Cunliffe; for painting, John Hargreaves; for plastering, A. Airey; for flagging and slating, R. & T. Seed (all of Blackburn). The total cost, including land and furniture, was about 21,000l.

**ASSEMBLY ROOMS, AMBLESIDE.**—The new Assembly Rooms at Ambleside have been opened. The work comprises a large assembly room, 80 ft. by 38 ft., with entrances and staircases at each end, and retiring-rooms, lavatories, &c. Over these there is a committee-room, and rooms for the caretaker, with a separate staircase. In the basement there is a large drill-hall, with a kitchen, pantry, store-rooms, &c., under the retiring-rooms. There is an outside entrance to the drill-hall, and a staircase leading to the assembly-room, so that direct access is provided when suppers, &c., are required. The building has been carried out with local stone and Green stone dressings, and has been built by the contractor, Mr. Arthur Jackson, of Ambleside; the steel roof for the large room is by Mr. Dawney; heating by Mr. Spencer (Oldham); ventilators by Messrs. Kershaw (Lancaster). The architect was Mr. Robert Walker, of Windermere.

**NEW PREMISES, LEADENHALL-STREET.**—The "West India House," Leadenhall-street, was formally opened last Monday by Alderman and Sheriff Sir Joseph Dinsdale, who attended in state. The contractors were Messrs. John Allen & Sons, of Kilburn, and the amount of the contract was about 24,000l. The building, which consists of mercantile and shipping offices, occupies the site of Nos. 95, 97, and 98, Leadenhall-street, and covers an area of about 7,000 ft. The building contains over 100 rooms, and comprises seven stories, served by a Waygood lift. The elevation is carried out in Portland stone and grey granite. Mr. Delissa Joseph is the architect.

#### SANITARY AND ENGINEERING NEWS.

**ELECTRIC LIGHTING AT EALING.**—The buildings of the Local Board's Central Electric Lighting Station at Ealing, which are being erected to the design and under the superintendence of Messrs. Bramwell & Harris, of Westminster, are approaching completion. The contractors for the buildings are Messrs. Wilkinson, Brothers; the machinery and boiler contracts are held by Messrs. Siemens Brothers and by Messrs. James Watt & Co., respectively; while the mains are being laid by The Callender Bitumen Company. All branches of the work are now so far advanced that the supply current will be commenced early in September. During the month of October the Local Board propose to hold an Electrical Exhibition in the Victoria Hall or other suitable place, so that customers may have an opportunity of seeing the uses to which electricity could be put, for lighting or for other purposes.

**DRAINAGE OF NAPLES.**—A recent report of the British Consul at Naples upon the trade of that city contains some interesting information as to the progress of the sanitary measures resolved upon for that city by Parliament after the visitation of cholera in 1883, and towards the cost of which a subvention of 4,000,000l. was granted. The general outline of the drainage scheme is: The city has been divided in three zones—high, middle and low, the latter running along the sea shore. The sewage and pluvial waters of the high zone will flow off by the natural decline; the sewage of the middle and low zones will meet at a certain point, and is



to be raised by pumping machinery into a sewer common to the three zones. The main drainage thus comprises a collector and an outlet discharging into the Bay of Cumæ on the combined system; a down-lift water—M. Chaplain is at work on a medal of the new President of the Republic.—The Municipal Council of Paris has voted the construction of a new lunatic asylum at Ville Evard, which will be the subject of a public competition. They have also approved the plans for a sanatorium for consumptive patients at Angicourt (Oise), at an estimated expense of 701,000 francs.—A monument has been erected at Châlons-sur-Marne to soldiers and sailors of the Department who have been killed in battle; and a monument has been erected at Charny, near Verdun, to a victim of the Franco-German war, named Vieillard, who was shot by the Germans in October, 1870.—A congress of owners of building property in France will be held at Lyons from the 6th to the 9th of August.—A new hospital is to be constructed at Marseilles, and another is shortly to be built at St. Etienne.—The Chamber of Deputies has addressed to the Minister of Public Works the long-desired canal from the Atlantic to the Mediterranean.—M. Fagel, the sculptor, is to execute for the town of Maubeuge a bust of the late President, which will be placed in the court of the Mairie on a pedestal designed by M. Neulles (architect).—The Town Council of Limoges has voted the erection of a statue to the late President, to be erected in a public place in the town.—We regret to have to record the death, at the age of sixty-eight, of M. Edmond Guillaume, architect to the Louvre and the Tuileries, and a Professor at the École des Beaux-Arts. We shall give a special notice of the eminent architect in the next "Letter from Paris."—The death is also announced of M. Edouard André, a wealthy amateur, well known for his enlightened taste in art. He had made a splendid collection of works of art in his mansion in the Boulevard Haussmann. He married some years ago Mlle Nelly Jacquemard, who has acquired a considerable reputation as a portrait-painter.—The two ceilings by M. Puvion de Chavannes and M. Bonnat, which we published last month, are now in process of being fixed at the Hôtel de Ville.—The Municipal Council have commissioned M. Goustiaux to represent them at the Congress of the Public Health Institute to be held in London this week.

**ST. CUTHBERT'S CHURCH, EDINBURGH.**—In the notice of this church in our last issue, in the sentence "far enough below the level of Princes-street to feel uncomfortably dark," the word printed "dark" should have been "sunk." The reference was merely to the architectural position of the church.

**THE YEADON WATER SUPPLY, YORKSHIRE.**—The Yeardon Waterworks Company have impounded in a reservoir at Hawksworth, between Baildon and Menston, a portion of the water which finds its way from 700 acres of moorland in that neighbourhood into three beck, and eventually into the River Aire. The people to be served numbered about 11,000 at the last census. The water drawn from three becks is carried in culverts to the reservoir, the principal structural feature of which is an earthen embankment half a mile long, 50 ft. high at its loftiest point, 250 ft. wide at the base, and 12 ft. across its summit. A watertight puddle wall is carried down the middle of the bank to a depth of 40 ft. below the original surface of the ground. The area of the new storage basin is a little over 16 acres, and, as it stands 765 ft. above the sea level, the force gathered by the water in its descent herefrom to Guiseley will be quite sufficient to send it up the opposite acclivity to Yeardon and Rawdon. The construction of the reservoir has cost about 22,000. The engineer who planned and has superintended the construction of the works is Mr. A. E. Preston, of Bradford; Mr. John Brigg, of Bingley, has built the reservoir, Mr. H. Wilson, of Great Horton, laying the pipes.

**WATERWORKS, NEW QUAY, CORNWALL.**—A preliminary trial has just been made of the new pumping plant erected for giving a supplementary supply of water to New Quay. The directors of the Water Company obtained possession of the disused mine-shaft at Mount View, which tapped a large spring of water. Mr. J. Thomas, M.Inst.C.E., of Mevagissey, advised that pumps should be fixed in the well capable of delivering 6,000 gallons per hour into the service reservoir on the top of the hill. An order was subsequently placed with the firm of engineers Stothert & Pitt, Limited, of Bath, to construct the necessary machinery. Pumps of the two-throw bucket type, 7 in. diameter by 18 in. stroke, are fixed in the well 64 ft. below the water level, and with their suction and delivery-pipes are suspended from steel girders built into the walls of the shaft a few feet above the water, and these also carry the valve-box, air-vessel, and rising main to the reservoir, into which the water is delivered at a height of 163 ft. above the pumps. The pumps are worked by helical spur-gearing to deaden noise, and are driven by a steam-engine of six nominal horsepower, the steam being supplied by a steel Cornish boiler.

#### FOREIGN AND COLONIAL.

**FRANCE.**—The Government has submitted to the Chamber of Deputies a scheme for the construction, near the fortifications of Paris (between the city and Asnières gates), of large isolated buildings to receive respectively the decorations and scenic properties of the Opéra, the Opéra Comique, and the Odéon. The cost of these buildings, plans of which

have been prepared by M. Bernier, architect, is estimated at 1,251,000 francs. The amount is proposed to be raised by the sale of property in Rue Richer, where the Opéra stores stood which were burned down last winter.—M. Chaplain is at work on a medal of the new President of the Republic.—The Municipal Council of Paris has voted the construction of a new lunatic asylum at Ville Evard, which will be the subject of a public competition. They have also approved the plans for a sanatorium for consumptive patients at Angicourt (Oise), at an estimated expense of 701,000 francs.—A monument has been erected at Châlons-sur-Marne to soldiers and sailors of the Department who have been killed in battle; and a monument has been erected at Charny, near Verdun, to a victim of the Franco-German war, named Vieillard, who was shot by the Germans in October, 1870.—A congress of owners of building property in France will be held at Lyons from the 6th to the 9th of August.—A new hospital is to be constructed at Marseilles, and another is shortly to be built at St. Etienne.—The Chamber of Deputies has addressed to the Minister of Public Works the long-desired canal from the Atlantic to the Mediterranean.—M. Fagel, the sculptor, is to execute for the town of Maubeuge a bust of the late President, which will be placed in the court of the Mairie on a pedestal designed by M. Neulles (architect).—The Town Council of Limoges has voted the erection of a statue to the late President, to be erected in a public place in the town.—We regret to have to record the death, at the age of sixty-eight, of M. Edmond Guillaume, architect to the Louvre and the Tuileries, and a Professor at the École des Beaux-Arts. We shall give a special notice of the eminent architect in the next "Letter from Paris."—The death is also announced of M. Edouard André, a wealthy amateur, well known for his enlightened taste in art. He had made a splendid collection of works of art in his mansion in the Boulevard Haussmann. He married some years ago Mlle Nelly Jacquemard, who has acquired a considerable reputation as a portrait-painter.—The two ceilings by M. Puvion de Chavannes and M. Bonnat, which we published last month, are now in process of being fixed at the Hôtel de Ville.—The Municipal Council have commissioned M. Goustiaux to represent them at the Congress of the Public Health Institute to be held in London this week.

**GERMANY.**—The Municipality of Berlin has appointed a committee to consider the proposals with regard to the proposed Metropolitan Overhead Electrical Railways. This means more delay, which is much to be deplored in view of the short time left for their construction before the 1896 Exhibition.—The building of the tramway over the Opernplatz has been commenced.—Work on the alterations to the Royal Opera House is now full progress. 7,500,000 is to be spent on the heating arrangements, and 2,500,000 on alterations to the stairways.—The telephone lines from Berlin to Munich, and from Berlin to Vienna (the latter is 660 kilometres long), are to be completed before the end of the year. The lines will also serve Dresden, Leipzig, Nuremberg, and Regensburg.—The Emperor of the Empire, William I. and his consort, by Professor Encke, have arrived from Carrara, and will be shortly placed in the mausoleum at Charlottenburg.—Professor Conrad Hase, since 1849 Professor of Architecture at the Hanover Technical College, has announced his intention of retiring in October.—The Saxony Ministry of the Interior is about to nominate a commission for the preservation of monumental works of art in the kingdom of Saxony.—Professor Dorpfeld's report as to the excavations undertaken at Hissarlik during last year has recently been published under the title "Troja, 1893." The excavators were successful in their chief endeavour, viz., the establishment of the existence of a city of the Mycenaean epoch in the so-called sixth layer.—The latest number of the *Limes* journal contains Herr Conrad's description of a castellum at Altstadt, near Miltenberg, discovered during the works on the railway from the latter place to Aschaffenburg, and Herr Kohl's report of his investigations of the "Limes Rhaeticus" at Monschort. Here the original frontier mark was met with about 4 ft. below the surface, in the form of the remains of a continuous wooden paling. The distance from the "Limes" wall varies from 2 to 17 yds.; the contour taken by this paling is more straggling than that of the "Limes" wall, which was undoubtedly constructed at a later date.—Work has been commenced on the foundations of the National Monument to the Emperor William I. at Berlin. The foundations being below the level of the Spree are likely to take a considerable time, as special works will be necessary to fence it against the river. The colonnade encircling the monument will be built in accordance with new plans by Herr Halmhuber, in which much of the ornamentation shown in the original model has been discarded. On the Spree side there is to be a slight curve towards the river which, it is claimed, will enhance the general effect.—A monument will be unveiled on March 22, 1897.—A competition is announced for the proposed statue of Prince Bismarck in front of the Königsplatz façade of the new Imperial Houses of Parliament. The statue in bronze is to represent the Prince as in

perial Chancellor on foot, in his Cuirassier uniform. The ornamentation of the pediment and the general arrangement of the approaches are left to the artist; a model of the statue, sixty centimetres high, and one of the approaches to the scale of 1 in 25 are required. The competition, in which premiums of the total value of 4,000, will be given, is restricted to German artists, and will close on June 1 next year. The architectural members of the jury, which numbers eighteen, and includes the President and Vice-President of the Reichstag, are Messrs. Ende, Kyllmann, and Wallot.—Two fountains are to be erected on the Gendarmenmarkt at a cost of 1,400.—The new church at Schöneberg, a suburb of Berlin, is to be consecrated on October 1. The edifice will be lighted by electricity.—The Emperor has approved of the re-election of Professor Becker as President of the Royal Academy of Arts.—Professor Jakobsthal has been elected head of the architectural department of the Charlottenburg Technical College.—Professor Hinderse's group, as well as Nikolaus, Emperor William's monument, are nearly completed. Barbarossa is represented seated on his throne just awakening from the long sleep that, according to the myth, has overtaken him.—The organ of Stasburg Cathedral is to be reconstructed according to plans by M. Merklin, of Paris. At a cost of 1,000.—The city of Dortmund has appointed the Minister of Public Works in favour of the canalization of the Lippe, so as to form a navigable waterway between Dortmund and the Rhine, the proposed prolongation of the Ems canal having been rejected.—The new German hospital at Jerusalem was opened in the beginning of the month.

**RUSSIA.**—The Government is establishing an archaeological institute at Constantinople with a view to aiding the investigation of the antiquities of Greece and Asia Minor by Russians. The annual grant is 12,000 roubles gold, and the control is vested in the Russian Embassy at Constantinople.—The Russian Emperor, Nicholas II., has presented the book of King Herod, discovered at Jerusalem during certain archaeological investigations, to the Imperial collections at St. Petersburg.

#### MISCELLANEOUS.

**GLASS BRICKS.**—We have received a circular describing and illustrating the "Falconier" glass bricks, made at Berlin, in Saxony. The circular describes the glass-bricks as hollow, hermetically sealed, and contain air. They are sent from the works ready for use. The laying of them is very simple, being accomplished in the same manner as ordinary bricks: viz., with mortar or cement. The daylight enters a wall of glass-bricks freely, but it is not transparent. The glass-bricks also impede sound, and being bad conductors of heat, the temperature inside the walls changes very slowly. This makes them a valuable material for building hot-houses, ice-houses, &c. The cost of heating a hot-house built of glass-bricks, for example, is 50 per cent. less than one built of window-glass. This of course one would naturally expect to be the case, but the initial cost of the structure must be considerably greater. We can, however, imagine other uses for the material than for green-houses. It seems worth attention. Messrs. H. Pahl & Co. are the London agents.

**SURREY AND SURREY ANTIQUARIAL SOCIETY.**—The annual excursion of this society for 1894 was to Farnham, and it took place on the 18th inst. As Farnham was visited in July, 1880, by this society, when a paper was read in the church by Mr. Ralph Nevill, and another in the castle by the Hon. W. St. John Brodric, M.P., and which papers are published in the eighth volume of the Society's *Transactions*, it was not thought necessary to visit those structures on the present occasion, and the party went first to Bentley Church, where the Rev. O. C. Lang, the Vicar, read a paper descriptive of the building. He said the oldest parts of the present church dated from about 1120 to 1150, this being also the date of the founding of Waverley Abbey.—It was stated that an older edifice had existed, and when constructing a drain on the north side of the churchyard a concrete foundation was discovered which seemed to point to some earlier building. When the renovation took place on the last occasion, the west wall of the church also contained many fragments of Norman capitals and mouldings, upon some of which were scroll patterns; the Norman font was also recovered, but in a much injured state. The stained glass in the east window was English workmanship of about 1450.—Mr. Lang described the bells, bronzes, and the monuments. The journey was then continued to Froyle Church, where Mr. Mill Stephenson, F.S.A., the hon. secretary, described the church, which consists of chancel and a large nave, the latter, as well as the tower, being rebuilt in brickwork in 1772. Portions of the chancel base, and the tower, have been destroyed. The east window and gable end, however, remained, and dated from about 1350 to 1380. The window was particularly interesting, being filled in with stained glass of that period, and consisted of numerous coats-of-arms. The colouring of the glass was very good, and Mr. Mill Stephenson was of opinion that it had the finest display of heraldry



in the whole of Hampshire. Crondall church was next visited, and here the Vicar, the Rev. M. C. Baynes, read a paper on the church and its monuments; and Mr. C. Forster Hayward, F.S.A., gave an architectural description of the building.

**COUNTRY AND LONDON TENDERS.**—At the last fortnightly meeting of the Metropolitan Asylums Board, at the County Hall, Spring-gardens, on the recommendation of the general Purposes Committee, the tenders of Mr. C. Wall, Chelsea, for the erection of the scarlet fever and diphtheria pavilions at the Brook Hospital at an aggregate sum of 96,357, were accepted. Considerable discussion arose upon several other recommendations of the committee bearing upon tenders in connexion with the same hospital. Mr. Elliott wanted to know why one firm had been passed over in preference to another whose tender was 22l. less. Mr. Scovell said that this was a matter which had been gone into in committee, and had only been decided upon after full discussion. Mr. Robinson thought they were bound to give the contracts to the lowest tender unless reasons were given to the contrary. He also considered that the tender of Messrs. J. Shillitoe & Sons, of Bury St. Edmunds, for the erection of other buildings at the Brook Hospital at 67,350, ought not to be accepted. In his opinion London labour ought to be employed, and he proposed as an amendment that the tenders of Mr. Charles Wall be accepted for two sections of the work in place of those of Messrs. Shillitoe. Mr. Brass seconded the amendment, which was carried.

**MOUNTAIN, MOOR, AND LOCH.**—The illustration of the late Mr. J. Causton & Sons) under this title is apparently like others of the kind, a publication in the interests of a railway company, to recommend the beauty and interest of the country through which the West Highland Railway passes; but it is really very well done, and is quite an agreeable and readable book, as well as practically useful to people who do not know the ground.

**ENGINEERING TRADES' REPORT.**—Messrs. Matheson Grant's half-yearly report says that strikes and labour troubles are among the main causes which at present hinder and postpone the improvement in trade which has been so long expected. Harvest prospects are favourable, and in other respects also there are numerous signs of recovery from the dulness of the last three years, which has restricted almost every kind of engineering enterprise. The heavy trades have specially suffered, for while in many branches activity has never ceased, railway construction, shipbuilding, and other industries which demand large quantities of steel and iron have been unduly depressed. But it is evident that the present accumulation of idle capital cannot for long remain unemployed; and it is likely to be used in countries and for purposes which will tend to divert the control of the British investor than has been the case in previous periods of revival. Railway enterprise in the United States has in the past absorbed a large share of British capital without directly benefiting British engineers or manufacturers. The destruction of confidence in the management of such railways, and the heavy losses incurred by the investors in them, may together tend to divert investments to India and the colonies. In India alone there are ample opportunities for remunerative railways; the traffic is waiting, plant and material can be bought cheaply, and the capital is available if proper facilities and permissions are granted. Even on existing railways expenditure on maintenance has been unduly restricted, and there will be much leeway to make up in the rolling stock and other plant which will be manufactured in India. Africa, too, the output of gold is largely and steadily rising, and with such increase will come the need for more railways and more mining machinery. And every new railway will assist in opening out a field for extensions and further development of mines.

The prices of pig-iron are rather lower than in January, and were it not for uncertainties in regard to the cost of fuel, strike of colliers in Scotland, and the closing of the blast furnaces, the tendency would probably be still downwards. The prices of finished iron are also very low and seem to be tending downwards, but even a moderate improvement in the general export returns of the country will, if continued, tell quickly in favour of the iron trade also. The steel trade seems to have settled down to a monotony of cheapness. Although the low prices are of course largely due to modern economies of manufacture, it is obvious that the current rates of 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

will be needed. The Tower Bridge over the Thames is finished. The Walkin Tower, now being erected near London, which was to outvie the Eiffel structure in Paris, is stopped, at a height of 200 ft., for want of funds. There has been a moderate export of bridges to India, China, and Japan. The principal railways at home are constantly extending and rebuilding their stations, and there is much strengthening and renewing of bridges. Prices for works of this kind will probably advance if the export trade continues to revive. The Portland cement trade continues about the same level of activity as during the last ten years has increased in quantity and importance, has since 1892 been depressed and unremunerative. The factories in the London district which produce the bulk of English cement and dominate the trade, have now an output capacity of about 25,000 tons weekly, but the sales last year reached the low level of about 15,000 tons, and although there has been a considerable revival since Easter, even now they hardly attain 20,000 tons, and there is no improvement whatever in price. The growing consumption—most of it for export—is however a good sign of returning activity in public works at home and abroad.

**THE LONDON SCHOOL BOARD AND PAINTERS.**—A correspondent having written to the School Board for London asking if the contractors for painting the schools this summer would be compelled to pay the union rate of wages to their workmen, and also if the unemployed painters residing in the district of each school would have the preference for work, has received a reply from the Clerk of the Board to the effect that the clause in each contract for painting with reference to the rate of wages is as follows:—"Where the London scale of wages is applied the contractor shall pay to the workmen employed by him the rate of wages mutually agreed upon by the Central Association of Master Builders of London and the London Building Trades' Federation. In all other districts where the London scale of wages shall not apply the contractor shall pay the workmen and all other persons employed by him in connexion with his contract not less than the minimum standard rate of wages which may for the time being be usual and generally paid where such workmen are employed." There is, he stated, no requirement in the contract that contractors shall give the preference to those workmen who live in the locality of each school, and the Board are not proposing to insert a clause to this effect in the contract.

**DEDICATION OF HACKNEY MARSHES.**—On the 21st inst., Sir John Hutton (Chairman of the London County Council) formally dedicated Hackney Marshes to the public for ever. The Marsh is a large area of flat meadow-land, intersected and skirted by the River Lea and its tributaries. It is 377 acres in extent, and has been secured by the London County Council at a cost of 75,000l., of which 50,000l. has been contributed by the Council, 15,000l. by the Hackney District Board, 5,000l. by Lord Amherst (the Lord of the Manor), and 5,000l. by private subscription. There are various interesting historical associations attached to the Marshes, and the old hostelry of the White Hart, which is said to have been built in 1513, and which was the resort of the celebrated highwayman, Dick Turpin, still stands.

**THE GUILD AND SCHOOL OF HANDICRAFT.**—The anniversary of the Guild and School of Handicraft was celebrated at Essex House, Mile End-road, on the 21st inst. A garden party was held in the grounds adjoining the house, and subsequently the annual meeting was held, under the presidency of Sir A. Rolit, M.P., when Mr. Walter Crane presented the report for the past year.—Sir Albert Rolit, in opening the proceedings, said it ought never to be forgotten that London was a great manufacturing city, and, therefore, it was essential that those in the City should take care of the instruction and training of our workmen. He expressed the hope that the authorities of the school would continue, as heretofore, first to give the scientific basis of all industrial education in knowledge, and then to combine that professional work with practical teaching in the workshop. This was the first institution of the kind which made this combination, and the work might well be fostered by the County Council, for the Guild much needed financial support.—Mr. Walter Crane said the efforts made in our large towns to bring the lagard technical education up to modern requirements were inspired solely by the desire to see England pre-eminent in trade. As an artist, he raised his protest, for he was not prepared to advocate England's triumphant progress as the workshop of the world. The first object of education was to make life livable, and they should not destroy the means of life in getting their living. He thought art and handicraft should ever go hand in hand. The main object was to produce things of beauty, and there should be no production for production's sake. It was curious that in France and Germany, and on the Continent generally, they were beginning to look to England to lead them in matters of industrial design.

#### LEGAL.

#### POLLUTION OF LAKE WINDERMERE.

Mr. JUSTICE COLLINS gave judgment on the 19th inst., at the Manchester Assizes, in the case of

Townson v. Bowness Local Board, which was tried at the recent Appleby Assizes. The action was brought by the plaintiff to prevent the defendants from turning sewage into Lake Windermere. His Lordship said that the defence was that the liquid turned into the lake was purified, so that it ceased to be sewage; that even if it was sewage the defendants adopted the best available means of treating it, and that the plaintiff was not the party aggrieved. The last-mentioned point was strongly urged. Mr. Townson was a riparian owner, and his land was about a quarter of a mile distant from the effluent. Further down he had an hotel, and he was one of a limited number of persons who had an exclusive right of fishing in the lake. It was perfectly clear that sewage passed into the lake, and counsel for the defence eventually admitted this. He thought it was clear that the effluent left something to be desired, and he found that a scheme had been prepared for dealing with it, and sanctioned by the Local Government Board, but the Local Board which proposed it was defeated, and a board which supported a policy of inaction elected. His Lordship also held that the plaintiff was a party aggrieved, and directed that the pollution should cease, but allowed six months for the construction of the necessary works.

#### MEETINGS.

MONDAY, JULY 13.

British Archaeological Association.—Annual Congress, Manchester.

TUESDAY, JULY 14.

British Archaeological Association.—Annual Congress, Manchester (continued).

WEDNESDAY, AUGUST 1.

British Archaeological Association.—Annual Congress, Manchester (continued).

Builders' Foremen and Clerks of Works Institution.—Ordinary Meeting of the members, 10 p.m.

THURSDAY, AUGUST 2.

British Archaeological Association.—Annual Congress Manchester (continued).

FRIDAY, AUGUST 3.

British Archaeological Association.—Annual Congress Manchester (continued).

Liverpool Engineering Society.—Excursion to the Oswestry reservoir and filter-beds, masonry dam and tower at Lake Vyrnwy.

SATURDAY, AUGUST 4.

British Archaeological Association.—Annual Congress, Manchester (concluded).

Liverpool Engineering Society.—Excursion (second day).

#### RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

14,766.—HAND-RAILS: D. Taylor.—For hand-rails, the length of which may be lengthened or shortened, say, for cisterns, &c., by having hand-rails at the end of an extension, as they remove from one dwelling to another, a hand-rail is formed of a red of circular section of wood connected by a sliding metal tube. It is fixed in position by a large screw staple, with flat circular socket, to which the rail is fixed by a screw.

14,777.—OUTLET VENTILATORS: T. W. Kitchen.—For discharging air or gas from buildings to the atmosphere, a ventilator with a turret and louvre top, and a bottom portion is provided, having inside louvres on the principle of venetian shutters. The louvres are formed in the turret as small truncated cones, and effectually prevent any draught.

15,173.—FIREPROOF FLOORS: H. Hood.—Slotted bars or hanger and boards form the seating for the cement for the floors, and these are supported by cross-bars resting on or fixed in slots in the girders.

15,234.—SAWS FOR STONE: J. Smith.—The frame carrying the saw is regulated to follow an approximately straight line from the highest to the central position where it is on about the same plane as the operating crank. Means for adjusting and securing the saws are also described in the specification.

161.—FIREPLACES: H. Ames.—In the stove, cast or wrought iron plates or apertures, so arranged as to form a movable slide or regulator which is fixed in the throat or lower opening of the chimney, and a special slide or regulator, are the main features of this invention.

7,137.—PARQUET PLATES FOR FLOORS: G. Uden.—The plates are of asphalt or such like substance, one side covered with a layer or veneer arranged according to certain patterns. Strengthening ribs are made in the plate, and the devices also bind it together.

8,549.—FIREPROOF CEMENT: A. Stone.—In addition to the flux used, pearlash, potash, soda, &c., are added in such proportions as may be found advisable.

#### NEW APPLICATIONS FOR LETTERS PATENT.

JULY 9.—13,233, J. Norton, Fasteners for gates and doors.—13,249, J. Farley, Joints of Earthenware or other Pipes.

JULY 10.—13,292, T. Wyford, Water-closets, 13,318, J. Burke, Wood-working Machines.—13,328, J. Onions, Kilns for Drying and Burning Bricks, Tiles, &c.—13,334, A. Titcher, Combined Cask and Sack and Hook.

JULY 11.—13,381, Syphon Siphons, J. Rogers.—13,387, G. Anderson, Stone Sawing Machines.—13,394, M. Furey, Windows.—13,395, J. Neech, Ventilating Sewers.—13,401, C. Hitchcock, Apparatus to be inserted in Chimneys, Chimney-pots, &c., for providing an ascending current of air to carry off the smoke from domestic fires, and prevent down draught.—13,404, A. and J. Titcher, Flushing apparatus for Water Cisterns.—13,418, H. Jones, Combined Sash and Cask Window.—13,429, A. Moore, Automatic Door-holder.—13,431, C. McCarthy, Preventing the freezing and bursting of Water-pipes.—13,447, A. Ball and J. Hickton, Fasteners for Window-sashes, &c.

JULY 12.—13,461, J. Shanks, Water-closets.—13,491, T. Gore, Wood Pavements, &c.—13,491, C. Barr, Sash Fastener.—13,521, T. Wyatt, Clamping of Floors, Joinery, &c.



[Contractions used in these Lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for



## ILLUSTRATIONS.

The Abbeys of Great Britain.—II., Rievaulx.—Drawn by Mr. J. A. Slater ..... *Double-Page Ink-Photo.*  
 The Abbeys of Great Britain.—III., Glastonbury.—Drawn by Mr. Roland W. Paul ..... *Double-Page Ink-Photo.*  
 Plan of Glastonbury Abbey.—Measured and Drawn by Mr. Roland W. Paul ..... *Double-Page Photo-Litho.*  
 Schools, Port Sunlight, Cheshire.—Messrs. Douglas & Fordham, Architects ..... *Double-Page Ink-Photo.*

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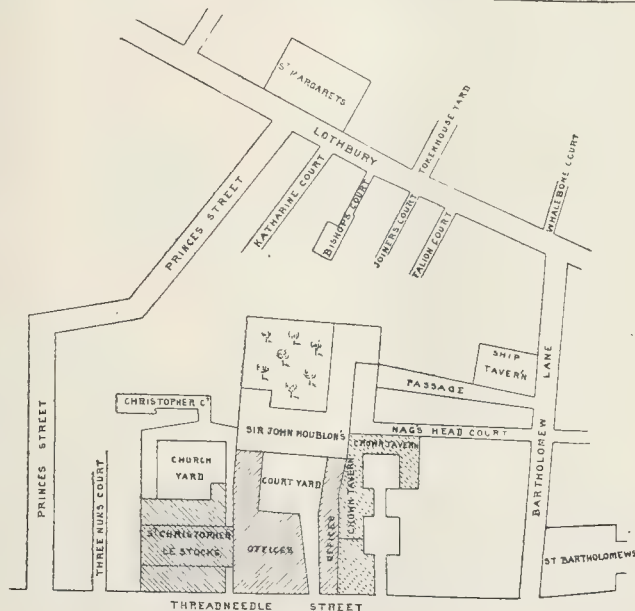
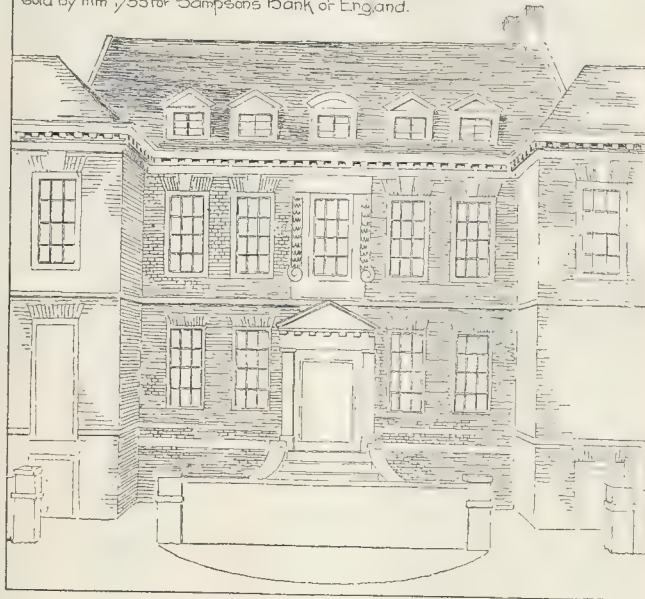
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### The Bank of England.

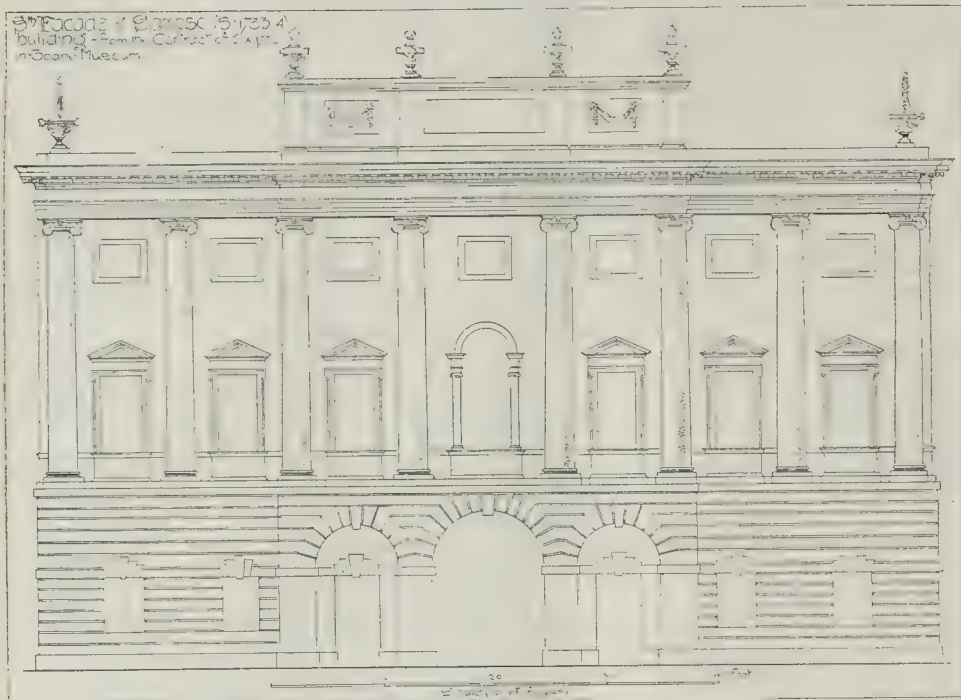
**L**N 1691 William Paterson, an enterprising Scotsman, projected a National Bank, whose subscribers, comprising several Whig merchants of eminence, who met at the "Wednesday" Club, in Friday-street, were incorporated on July 27, 1694, as the Governor and Company of the Bank of England, with a capital of 1,200,000*l.* lent to the State at 8 per cent. interest, and an annual subsidy of 4,000*l.* The first Governor was Sir John, a son of James Houblon, whose ancestor, Peter, had fled from Lisle to England to escape the Duke of Alba's persecution. As the Bank has thus just completed two hundred years of existence we may at this juncture not inopportunely describe how its buildings have grown from a small beginning to their present proportions.

Up to 1694 the Bank was carried on at Mercers' Hall. Removing to Grocers' Hall, they remained there until June 5, 1734, on which day business was first transacted in a building on the familiar Threadneedle-street site, designed by George Sampson. For Sampson's bank they had taken Sir John Houblon's house and garden, of which a plan (1730) is preserved in the Bodleian. Views of the house are rare: our sketch is from a water-colour by T. Hosmer Shepherd in the Crace collection, and marked as copied from a drawing in the Crowle Pennant—where, however, we have failed to find the drawing. West of the house stood St. Christopher-le-Stocks Church, with a graveyard along its north side. East of the house were the "Crown" tavern (a favourite resort of Fellows of the Royal Society when they met at Gresham College, close by), and southwards of the tavern the Sun Fire (old) Office; north-east of the latter two were Nag's Head-court and the "Ship" tavern. At that time Princes'-street had two elbows, turning into the Bank's present site; and so to Lothbury, about opposite St. Margaret's Church. The buildings we name were approached thus: from Threadneedle-street by Nun, or Three Nuns, court, leading into Christopher-court; from Lothbury, by Catherine, Bishop's, Joiner's, and Falcon courts; from Bartholomew-lane (wherein stood the "Ship" tavern), by Nag's Head-court. Thus the original banking-house (the church and churchyard remained until Soane's time) stood over the ground occupied in later years by the court-room, pay-hall, bill-office, bullion-court, and chief

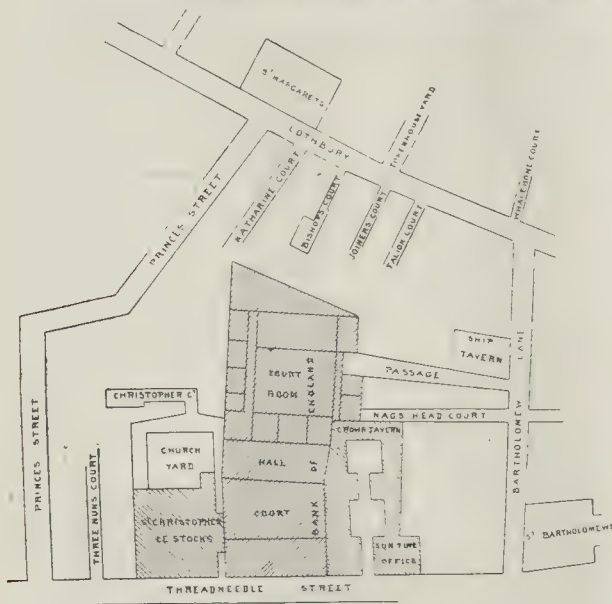
Sir John Houblon's House Threadneedle Street  
 sold by him 1733 for Sampson's Bank of England.



Plan of Sir John Houblon's House and Garden, 1731. (From the Gough Collection in the Bodleian.)



Street Front of the Bank of England, as built from Sampson's design in 1733-4.\*



Block Plan of Bank and adjacent site in 1734.

cashier's office, reckoning from south to north; bullion-court and the cashier's office representing Houblon's garden, the pay-hall and bill-office his house. One of the many volumes of drawings, papers, reports, &c., relating to the Bank, made or collected by Soane, and, with his models, preserved

\* We have to thank the Trustees of the Soane Museum for permission to copy this and the block plan and detail plan of Sampson's building.

in the Soane Museum, contains Sampson's contract and drawings, &c., 1732. There is also the executed indenture, on seven large skins, dated October 6, 1732, between the Governor and Company, and Thos. Dunn, John Townsend, masons, Nathaniel Edmonds and Joseph Martyr, joiners; with ground plan, section, and elevations of the south fronts of South Court and Inner Courts, attached. The contract price

amounts to 13,153*l.* 7*s.* 9*d.*, plus old materials *in situ*, and the work is to be finished by September 29, 1733. We give, by leave of the Soane Museum trustees, the following extracts:—

"Proposals for erecting and building a new bank . . . which is to contain in front from East to West next Threadneedle street eighty two foot nine inches and in depth from North to South twenty four foot all in the clear abutting North on the Courtyard leading to the Great Hall which is seventy four foot nine inches from East to west and forty three foot in the Middle from North to South which joins to another Building North which is the Great Hall in length from East to West seventy four foot in the Clear in the Middle and in breadth from North to South forty foot in the Clear the Building adjoining to the North side of the said Hall containing from East to West seventy four foot by twenty three foot in the Clear the extent of the Ground or Courtyard Northward of the Directors Room forty seven foot by fifty two foot Eight inches in the Clear the East and West Wings to the said Court forty seven foot by twenty foot. Each in the clear part of North west staircase and Building, adjoining eighteen foot six inches by thirty one foot in the Clear, The north east staircase twenty one foot six inches by eighteen foot six inches in the Clear, The Accomptants' Office northwards of the Back Court Yard fifty six foot by twenty eight foot in the Clear, . . ."

The south front was to have three-quarter columns, and to be of Portland rustic and ashlar, the two inner fronts to be of Portland with "tin pan of pediment" [*sic*] for the middle front. Then follow particulars of the masons, proposals of the joiners, and particulars of the various trades concerned.

"Inside the Hall doorcase, withinside as without Corinthian pilasters intabulature with Mouldings and Architrave, arch enriched according Palladio. A Venetian window at the West End with double Ionick Pilasters without and within with its proper window stools, intabulature enriched according to Palladio. [A blank similar window to be at east end]. . . ."

Sampson's *façade* still overlooks the paved (open) court entered from Threadneedle-street. West and Tom's perspective view, 1739, shows the south front of his middle court as a Corinthian order of three floors with four columns and angle pediment, and





Plan of the Bank as built by Sampson, 1733-4. (From the Contract Drawings in the Soane Museum.)

his inmost court as two floors on a rusticated basement.

During 1766-83 Sir Robert Taylor\* made extensive additions, for the most part eastwards to Bartholomew-lane, taking in the "Crown" and "Ship" taverns, Nag's Head-court, and the Sun Fire Office.† His east wing included the Rotunda, consols-

dividend, transfer, bank-stock, and other departments, with the quadrangle containing the parlour. Taylor's work is illustrated in T. Malton's folio volume (1790-2) of thirty-two aquatint plates (after his designs, in Ackerman's "Repository," and by others. His front consisted of a rusticated stylobate, supporting a Corinthian order, flanked with an angular pediment at each end.

Taylor died in 1788. In October of that year Sir John Soane was appointed, at Lord Camelford's instance, architect and surveyor to the Bank, a post he resigned in October, 1833. In his "Designs for Public and

Private Buildings," 1828-31, fo., he reprints his account of surveys he made of the Bank buildings, and, in view of increasing requirements, sets forth his recommendations for an entire reconstruction of the exterior. He says:—

"This great national structure, erected at different times without due regard to the uniformity of the exterior—the centre built in 1763 [sic] in the style of Palladio; and the exterior of the Rotunda and Stock Offices, &c., next St. Bartholomew-lane, Threadneedle-street, and Prince's street, erected between the years 1765 and 1788, from a design in imitation of the celebrated Garden Front of the Pope's Palace in Rome—is so different from the exterior of the centre building, as the North Front, erected in 1794, is from either of the foregoing; the whole presenting a great mass of heterogeneous, unconnected, and discordant parts. . . . Plans and models were then prepared for constructing the roof of the (Bank Stock) Office on stone piers, with arches springing from them. . . . The roofs of the other Stock Offices and of the Rotunda were found to be so completely dilapidated as not to admit of repair; they have since been taken down and rebuilt with incombustible materials, no timber being used in any part of the new construction. . . . In 1800 the widely increased concerns of the Bank made an application to Parliament necessary. . . . On this occasion I submitted to the Committee designs to extend the North Front westward, and to connect together the whole of the old Offices, and those required to be erected, in order that the exterior of the Bank might hereafter form one uniform appearance. . . . This design has been acted on without any deviation, except in the North Front where . . . the space being found insufficient for the Portico the architecture was unavoidably contracted to meet the unforeseen circumstance. In other respects the unforseen plan has been followed; so that the whole of the exterior of this great National Edifice now presents as much uniformity as could be expected in a Building of such extent, continued progressively, as circumstances required, during a period of upwards of thirty years."

Soane's plan extended to a widening of St. Bartholomew-lane, Lothbury, and part of Prince's-street, and was drawn up concurrently with the younger Dance's for straightening Prince's-street, despite the opposition of the Grocers' Company to encroachment upon their garden; for that, however, they received 20,000*l.* compensation. He demolished St. Christopher's Church, and some houses adjoining, with Three Nuns', Christopher, Catherine, Bishop's Joiners', and Falcon Courts, thus making space to west and north for the Garden-court (churchyard), Court Room, Note Office, Numbering Room, Accountant's and Discount departments, Governor's rooms, Secretary's lodgings, Lothbury- or Bullion-yard, Post Bill Office, and so on. Externally the Corinthian style of the circular temple at Tivoli prevails; an entire portion of it appears in the south-west angle. The Chief Cashier's department is said to be based on the orders of certain temples in Rome; the Discount Office ante-room on Hadrian's Villa; Bullion-yard is copied from the Arch of Constantine, and has figures of the Ganges and Thames by Banks. In 1808-10 Soane designed the five houses, New Bank-buildings, in Prince's-street, and in 1818-9, the National Debt and Annuities Office, Old Jewry. Bank-buildings (old) were pulled down in 1843; they stood in two blocks along the south side of Threadneedle-street, west end. To Soane succeeded C. R. Cockerell, who designed the Private Drawing Office (1836) and the Drawing Office (1849). The south side of the Bank was heightened with an attic in 1850, and a library built for the clerks. In a "Note" on October 20, 1888, we commented upon the addition of a gallery around the Rotunda, under the Dome, with the cutting across the niches there which form part of Soane's scheme.

St. Christopher-le-Stocks, so named after the adjacent stocks market established in 1282 by Henry Waleis, Mayor, and now the site of the Mansion House, was built in 1462, and its tower added *circa* 1500. The walls escaped from the Great Fire; Hatton says that its interior was rebuilt in the Tuscan style. The body of the church had a nave with two aisles and a chancel, lighted by round-headed windows; at the four angles of the tower were obelisk pinnacles with vanes, carried down through the upper two stages, which

\* Pupil of Cheere, whose statue of William III. is at the Bank, as well as Taylor's figure of Britannia.

† Established in 1706. Rebuilt by Professor C. R. Cockerell on the site of St. Bartholomew-by-the-Exchange, pulled down in 1841: the south wall and chapel of church were kept for the fire office.



Plan of the Bank as now existing.

retained their pointed windows. An open parapet between the obelisks had four pedestals surmounted with pines. That composition perhaps suggested to Wren his similar group for the tower of St. Mary Somerset, in Upper Thames-street, though there the obelisks rise from the parapet, and the pedestals from the angles. It is not commonly known that in the churchyard, now the Bank garden, was buried (1621) Thomas Harriot, tutor and friend of Raleigh, who sent him as geographer with Sir Richard Grenville on his second expedition to Virginia, whereof Harriot published his account in 1588. The greatest English mathematician of his day, Harriot frequently corresponded with Kepler; in December, 1610, he observed, independently, with a telescope of his own contrivance, spots in the sun just four months after Galileo first discovered them, having on October 17 discovered Jupiter's fourth satellite, which Galileo detected on January 13 that same year. Henry, ninth Earl of Northumberland, gave him a home at Sion House, and his executors erected a monument to him in the church.

We may add that amongst the views and works consulted for the purposes of this account is the Grangerised copy of Pennant, bound in six fo. volumes, which Britton bought for 650 guineas for Sir John Soane at the sale, at Sotheby's, of Wm. Fauntleroy's library in April 1825. Fauntleroy, member of a banking firm at 6, Berners-street, was executed for forgery, in company with Robert Astlett, upon the Bank, by which the latter lost, it is said, nearly 700,000*l*. During the "No Popery" riots a force of regulars and City volunteers garrisoned the Bank. It is amusing to read how Wilkes, ever zealous, as Dr. Johnson observed, in the cause of law and order, gained considerable renown by his sallies and capture of some of the mob with his own hands.

Of the architectural aspect of the Bank of England as now existing, which is mainly

due to Soane, it may be said that if it is somewhat heavy in its lines and general appearance, it is a building very well treated in detail according to the prevalent taste of Soane's day, being in this respect certainly above the average of work of the period; and it has the very great merit of looking exactly like what it is, in regard to architectural expression; no one could well take it for anything but a bank. The system adopted of enclosing the whole collection of departments within what may be called a "blind" outer wall—a windowless rampart of defence, adds to this effect, and was probably in a practical sense the best course that could have been taken for safety, at a time when window defences were much less developed than at present.

The Bank has nine branches in the provinces, and two in London—at Uxbridge House, Burlington Gardens (Vardy, 1792), and Temple Bar (Sir Arthur Blomfield, 1888.)

#### NOTES.

HERE is some satisfaction in the reflection that in all probability that Parisian monstrosity called the Eiffel Tower is doomed. As the reader will see from the letter of our Paris correspondent on another page, M. Trélat has succeeded in gaining from the Committee for the Paris Exhibition of 1900 the concession that architectural competitors for the design of the site and buildings may be at liberty to discard the Eiffel Tower from their designs, if they are so minded. Considering the general dislike felt by all artists for this Brobdingnagian toy, and the probability that every architect in this important competition will desire to signalise his own genius and to strike out a line of his own, the Eiffel Tower stands very small chance of surviving. And as what we may call the "Wembley Park Folly" of the same kind is already stopped,

with its four legs in the air, for want of funds, one may hope that there will soon be an end to this class of absurdity.

THE Committee of the House of Lords on the Betterment question has already borne fruit. The Bill of the London County Council in regard to the Tower Bridge approach, and that of the Manchester Corporation in regard to some improvements in that town, have been modified in accordance with the recommendations of the Committee. In a short time, therefore, we shall have an opportunity of watching the actual working of the principle under the safe guard suggested to the Committee of the House of Lords. To an outside critic, however, it is clear that but for the shortsighted action of the Government last Session in refusing to consent to the appointment of a mixed Committee of the House of Lords and Commons in this, essentially a non-political question, the matter might have been settled a year ago, and the improvements required by the Bill of the County Council might already have been begun. We hope also that the County Council will learn from this incident that a new departure of an important kind cannot be effected at their mere will and pleasure and in any form they desire, if it affects large public interests, without previous consideration by an impartial and competent body, such as was the Committee of the House of Lords which has recently investigated the question.

A MEMORIAL on the subject of the threatened submersion of the Nile Valley and district above Assouan has been addressed to Nubar Pasha by the Society for the Preservation of the Monuments of Ancient Egypt. After expressing satisfaction with the prospect opened out for the prosperity of Egypt, in "the admirable study of the subject of Perennial Irrigation by the Under Secretary of State for Public Works," the memorial proceeds:—

"We remark that the Technical Commission have recommended the construction of a reservoir dam at Assouan which will submerge the largest and most important parts of Nubia and ruin the temples of Daboud, Gertassch, Tafah, Kalabshah, Dakkeh, and Aft-ed-Donieh, as well as the towns, cemeteries, and other remains of this region, besides leading to the removal or ruin of the various temples of Philæ, which are some of the most beautiful monuments in Egypt. We therefore express to your Excellency our deep regret at the recommended construction of a reservoir at Assouan which will cause such results, so unhappy for science and art; and we trust that some other project will be considered in order to reconcile the interests of agriculture with those of art, history, and archaeology. We hope that before the immediate season for action arrives some efficient scheme may be adopted which will avoid, so far as possible, the destruction of valuable monuments. We do not wish to express our opinion as to the best manner of carrying out the important object of improving the irrigation of Egypt, as this is a point for the Egyptian Government; but we would venture to ask whether it is not possible that an equally good site may be found at some place south of the Second Cataract, when, as it is to be hoped, the country may again be re-opened in a few years to civilisation under the rule of Egypt."

A long list of signatures follows, including a good many well-known names. It is satisfactory to learn that similar protests, in very strong terms, have been signed by eminent men of letters, science, and art, both in France and Germany.

ARCHÆOLOGISTS of whatever school will hear with deep regret of the death of Heinrich von Brunn. His health has been indifferent for some time, but he had not yet completed his seventy-second year, and he was midway through two important works, in one of which, though he has probably left material for its completion, his hand will be sorely missed. We allude to his illustrated "History of Greek Art." Professor Brunn was the pupil of Welcker, and belonged to a school whose methods are now, in some respects, well-nigh extinct. But if the methods of archaeology have



steadily grown and developed, we have yet no individual archaeologist, save his contemporary, Professor Curtius, whose fame looms so big. Brunn's reputation was made early and made decisively by the publication of his *Geschichte der Griechischen Künstler*, published between 1853 and 1859, a standard work still unreplaced. He has written since on Etruscan urns, on the Problems of Greek Vase-painting (a not very happy effort), and many other subjects, but he has not added anything substantially to his reputation. It was, perhaps, even more as a teacher than as a writer that his influence was felt. For ten years he was Secretary of the German Institute at Rome, for three he taught at Bonn, and finally, in 1865, became Professor at Munich. There he arranged his famous gallery of casts; there in his demonstration lectures he was seen at his best, and never better than when, after the most brilliant and convincing exegesis, he would turn and say, "Eine Reihe von Problemen."

UNDER the title "Architectural Education for America," Mr. Barr Ferree has edited a pamphlet (for private circulation) in which three principles in architectural education are advocated by three writers: Mr. Rotch writing in favour of the *École des Beaux-Arts*; Mr. Andrews in favour of the architect working hand-in-hand with the craftsman, apparently so thoroughly as not quite to know which is which (a method from which we should not expect favourable results, though we have no doubt the "craftsman" will appreciate it); and Mr. Gibson, a former English student, writing in favour of the English method as the best for combining theory with practical experience. Mr. Ferree sums up, and from his summing up we gather that he is rather in favour of the English system, but applied with due consideration of the American conditions of life. American architecture at present, he asserts, is dominated by commercialism to a greater extent than any other architecture ever was. The business of an American architect at present is to solve certain conditions "in the best way, and usually at the least expense." The "École" training certainly is not likely to do much in preparing him for this kind of career.

"It is a remarkable fact that a school man will always talk better than he works. He will astonish you with the breadth of his training—broad, not so much for his sojourn in Paris as for his own personal application; he will amaze you by the correctness of his theory; he will dazzle you by the brilliancy of his knowledge; and then he will sit down and do the most preposterous things in design, simply because, with all his theory, his training, his brilliancy of thought, his power of expression, he has so wedded himself to certain forms and certain academic modes of expression as to be totally oblivious of their complete inapplicability to the necessities and exigencies of American architectural conditions."

That is a lesson which we fancy will soon be practically and irresistibly thrust upon the convictions of the young American student of the new school, who will work only in Paris, and calls the drawings he sends home "envois."

IN the last issue of the "Sanitary Chronicles of the Parish of Marylebone," Dr. Wynter Blyth raises an important question in regard to legal requirements as to the position of water-closets. He draws the attention of his Vestry to the by-law of the London County Council which requires that a new closet is to be constructed so that "one of its sides at the least shall be an external wall, . . . which external wall or walls shall be immediately upon the street, or upon a yard or garden or open space of not less than 100 square feet of superficial area measured horizontally at a point below the level of the floor of such closet." Dr. Blyth says that, almost daily, plans are presented to the office, many of which do not strictly conform to the letter of the by-law, although the spirit is preserved. He has interpreted

the by-law to mean that there should be sufficient air-space adjacent to the closet, and has disregarded the walls of gardens or yards where the walls or boundary-fences have been of a reasonable height. But the question having been put to the London County Council directly, whether the open space is to belong exclusively to the house, or whether it may include, for the purposes of measurement, yards belonging to adjoining houses although divided by fence-walls, they appear to have ruled that the open space need not belong exclusively to the building in connexion with which the water-closet is constructed, but must not include yards belonging to adjoining houses and divided by fence walls, as it would not be an open space if it were intercepted by walls or fences. Dr. Blyth contends that, if this is the correct interpretation, the by-law, as applied to existing buildings, is both unreasonable and impracticable, and will prevent the removal of closets from undoubtedly insanitary conditions to places where they could be conveniently and advantageously placed; and that it will also, in a number of cases, absolutely prevent the owner of trade premises providing necessary and additional closet accommodation where such accommodation is urgently required. There can be no doubt that as to the practical working of the by-law in many cases the results must be as Dr. Blyth states. It is to be hoped that the Council, to whom a communication on the point has been addressed by the Marylebone Vestry, will reconsider the wording of this by-law.

THE report made to the Local Government Board by Dr. Theodore Thomson (June 11), on the epidemic of enteric fever in the borough of Worthing and the villages of Broadwater and West Tarring is too long to go into in any detail, but it is a very instructive one, and shows the importance of water companies ascertaining fully the nature and conditions of the sources from which they are deriving supply for a district. Contrary to the usual experience, the disease was not found connected with the drinking of well-water, but was coincident with the addition of a new source of supply in the Worthing water service, which proved to be contaminated by sewage percolation in the ground. The report contains a great deal of information and suggestion which is generally useful. It concludes as follows: "The history that has been set forth of the severe outbreaks of enteric fever in the four areas of 'Worthing,' 'West Worthing,' 'West Tarring,' and 'Broadwater,' adds one more instance to the already lengthy list of examples of the disastrous consequences that may result from a specifically polluted public water supply. From it, as matter of first instance and of chief importance, the several Sanitary Authorities should learn the necessity of supplying a water pure at its source and free from risk of pollution after collection and during delivery. To fulfil this end they cannot display too great energy in pushing on the works necessary for the provision of a pure supply of a permanent character. The present supply procured from the well near Broadwater village, while undoubtedly preferable to that which it has replaced, is nevertheless not one that can be regarded as beyond risk of contamination. It is too near the village of Broadwater and to other human habitations to be beyond suspicion of pollution. It is therefore most desirable that a water of undoubted purity should be made available for use as soon as possible. Further, the avoidance of risk of local pollution of water-mains should be a matter of the most serious care to the Sanitary Authorities of the districts concerned. That this is liable to occur in the case of an intermittent supply delivered through mains fitted with ball-valves is unquestionable; and accordingly this matter should receive most careful consideration."

IN our "Note" of March 19, 1892, we directed attention to an open space between Bedford-square and Great Russell-street, on the Bedford estate, which had been appropriated for the erection of a street of flats. One of the blocks, built by Messrs. Collis & Sons, after Messrs. Martin and Purchase's designs, is nearly completed; the remainder we imagine will follow, greatly to the detriment, as we pointed out, of the amenity and healthfulness of the overcrowded neighbourhood. Further building, upon an extensive scale, is about to be undertaken in Russell-square, where a large area is now being cleared by the demolition of Nos. 1, 1a, 2—8 in the square—a block, with its gardens, standing on the east side—together with Nos. 1, 1a, and 2, (the home of Joe Munden, the actor) Bernard-street, Nos. 58, 59, 60, Guilford-street, and the west side of the Colonnade, whereof the greater portion, having a covered gallery, was rebuilt about two years ago. These houses were erected on the plotting out of the square in the Long, *prins* Southampton, Fields, behind Bedford House, ninety years ago, when "Gore-street" had been begun, and the Toxophilite Society were about to vacate their ground taken for Tavistock-square. The square's east side was set in alignment with Baltimore, afterwards Bolton, House, between Guilford-street, and No. 65, (in the square) where Sir Thomas Lawrence lived for many years. Bolton House, since divided into two, is readily distinguishable by its portico, rounded bay, and dormer roof. It was built in 1759-60 for Lord Baltimore, who died in 1771. It was next occupied by Harry, sixth Duke of Bolton, nephew of Charles, third Duke, who married Lavinia Fenton as his second wife, and left no legitimate issue. The house was then tenanted by Lord Loughborough, advanced Earl of Rosslyn, when Lord Chancellor, *obit* 1805, Sir John Nicholl, and Sir Vicary Gibbs. Sir Thomas N. Talfourd lived in the north part of the house, when, in 1837, he edited the works and letters of Charles Lamb, and continued to occupy it for some years later. In Timbs' "Curiosities of London," the square's dimensions are given as 665 ft. 6 in., north side, 665 ft. 3 in. south, 672 ft. 7 in. west, and 667 ft. 1 in. east—encompassing an area a little less than that of Lincoln's Inn-fields.

WE read that a notable tavern, the "Goose and Gridiron," in London House-yard, by St. Paul's, is about to be pulled down. In its front wall is a carved stone bearing a mitre between the letters "T" and "F," and, beneath, the date "1786" on an oval shield, being, we believe, the only memorial extant of the residence here, in times past, of the Bishops of London. The tavern was originally known as the "Mitre," and one of the earliest "music" houses in London. A subsequent landlord, in ridicule, perhaps, of its former pretensions, set up the sign of a goose striking a gridiron with its foot, calling it the "Swan and Harp." This sign has lately been removed, and the house, No. 8, is closed. The tavern, however, has other claims upon our notice, for it was there that the workmen who built St. Paul's were paid their wages, and that the St. Paul's Freemasons' Lodge was established, and met, under Wren's presidency, during several years. It is stated that Wren gave the lodge three candlesticks carved out of mahogany, with the trowel and mallet used by Charles II. at the laying of the first stone of the cathedral on June 21, 1675. The same mallet was used by the Prince of Wales, when, on May 20, 1880, he laid the foundation-stone of St. Mary's Cathedral, Tuoro.

IN reference to the new nave of St. Saviour's, Southwark, Sir A. Blomfield informs us that the variation from the choir



architecture, in inserting a marble shaft into the triple vaulting shaft, is really a restoration of what formerly existed in the nave, as discovered in pulling down the building. The architect had felt some hesitation about adopting this, as appearing to make the nave more ornate than the choir, but as the feature was undoubtedly there before, it was decided to repeat it. We may add that the clerk of works has directions to admit any one who wishes to see the nave.

WE have commented several times on the unfairness of the increasing habit of asking architects for a deposit fee before they can have the instructions and conditions for a competition supplied to them, a fee to be returned only on the receipt of a design in accordance with the conditions. The essential objection to this is that an architect cannot know, until he has seen the conditions, whether the competition is such a one as he would be willing to enter into; and if it is not, he has forfeited his deposit for no return of any kind. We may therefore call attention to the new departure made by the Durham County Council in their advertisement of a competition for new county offices, which will be found among our advertisements in the present issue. They require a deposit of 5*l.*, to be returned either on the receipt of a design, or on the return of the documents within fourteen days. This is a reasonable and fair manner of acting. It will put a check on those light-hearted persons who send for the conditions of every competition they see, often without an idea of seriously going in for it; and at the same time it gives an architect the opportunity of recovering his deposit if he finds the conditions of the competition unsuitable to his views, or beyond his resources.

#### LETTER FROM PARIS.

AFTER the pomp of the obsequies of the late President as celebrated in Notre Dame, the gorgeous ritual of the Catholic Church, the funeral ceremony at the Panthéon appeared singularly cold and commonplace in the large empty nave, bare of all such sculptural decoration as that which gives such a rich and harmonious total effect to Westminster Abbey.\* This cold effect of the building consecrated to our great men seems on this occasion to have struck everyone alike, and a member of Parliament intends, it is understood, to ask the Government for a vote of 250,000 francs to fit up the national temple of fame with decoration and furniture fitting for the occasion of a great public funeral. Such an improvement is very necessary, but the work ought to be very carefully studied in an artistic sense in order to harmonise with the paintings which have already been executed, as well as the several important monuments commissioned some years ago from M. Falguière, M. Rodin, and some other eminent sculptors. If the funds are voted, one result will probably be to hasten the work of the sculptors also, which has rather dropped out of public memory of late.

As we have already announced, the removal of the Eiffel Tower has now become matter for discussion; and the architects who may compete for the design of the 1900 Exhibition buildings will have full power to eliminate it from their schemes. This will be a great satisfaction to the competitors, who will be able to work out their plans freely without troubling their heads about this enormous metallic structure, void of utility and character, left by the last Exhibition, and which has become from every point of view an encumbrance and a nuisance. It is to M. Trélat that we owe this important change in the programme of the competition. Some courage was necessary to plead in this case the cause of good taste and of art, and M. Trélat has no want of that quality. The 1900 Exhibition will no doubt have some other attraction which will attract with the general public the same kind of *succès de curiosité*, but it is to be hoped that this time at least the central object of the exhibition

may present something in the way of artistic interest, and not be a mere industrial *tour de force*.

The jury who have been called on to adjudge the "Prix de Rome" in painting, have, after a very long discussion and several votings, given their award. In consequence of the recent death of young M. Mitrency, the "Grand Prix" of last year, the prize has this year been given *ex æquo* to two pupils of the École des Beaux-Arts, MM. Leroux and Déchenaud, of whom the former will remain at Rome for the four regulation years; the latter will remain three years, missing the one year which had already gone to the deceased prize-man. As usual, ancient history furnished the subject of the competition, "Judith showing the head of Holofernes to the inhabitants of Bethany." M. Leroux, a pupil of M. Bonnat, has produced a picture with a good deal of life and movement, and in a bright, clear style of colouring. M. Déchenaud, a pupil of M. Lefebvre and M. Benjamin-Constant, who obtained the "Second Grand Prix" in 1891, sends a work which may be described as conventionally and academically correct. M. Laparra, a pupil of MM. Lefebvre, Robert-Fleury, and Bouguereau, has obtained the Second Grand Prix with a picture finely composed but sombre in colour. M. Benner, holder of the "deuxième Second Grand Prix," is the son of the well-known painter of that name. He shows undoubted artistic talent; but we regret not to see among the rewarded artists the names of M. Charbonneau and M. Guinier, whose works show very fine qualities, both in regard to imaginative conception and colour.

The ceilings of M. Bonnat and M. de Chavannes, which were illustrated in the *Builder* of June 2, are now in their places in the Hôtel de Ville, and one can study them amid their proper and permanent surroundings. The result, it must be confessed, is entirely in favour of M. Puvion de Chavannes, whose luminous and yet restrained tonality harmonises admirably with the light-tinted stone-walls. The subordinate subjects in the spandrels and tympana, which will shortly be put in their places, have been treated in a prevailing light violet tint, which is to lead gradually up to the colder and more distant tone of the ceiling, and give it etherealised effect. M. Bonnat's ceiling, on the other hand, errs by exaggerated strength. In its position in the Salon des Arts, the ceiling of which is not very high, it seems to start from its frame, and overpowers the architecture, the accessory decorations and the surrounding paintings, and is a kind of orgie of blue, white, and black which nothing can stand against; it gives the spectator the sensation of a thundercloud bursting over his head. The neighbouring ceiling by M. Bernad, which is tolerably strong in colour, appears nevertheless quite tender and misty in effect by the side of this. M. Bonnat could very well, by retouching the work, do away with some of this violence of effect, and would be wise to recognise the necessity for such an alteration.

The Municipal Council, which has just separated for the vacation, has definitely approved the plans of MM. Legros, *père et fils*, for the Boucicaut Hospital. The architects, whose design obtained the first premium in the recent competition, will therefore be able to commence without delay the works for carrying out the building, the cost of which is estimated at 4,215,000 fr., and the furnishing at 270,000 fr. The Council has also approved of a scheme for the construction, near the public abattoirs, of a large freezing-mill, one object of which is to lay up a large stock of frozen meat in time of war. The establishment is, in fact, to be placed entirely under the control of the War Department, which will contribute half the cost, estimated at 600,000 frs.

At the École des Beaux-Arts the Chenavard competition has just been adjudicated. It is open to all the pupils of the École, and the results have been rather interesting. The prize in painting has been conferred on M. Rouault, pupil of M. Moreau, for a remarkable painting of "Christ Disputing with the Doctors." In sculpture, M. Legrand, pupil of M. Thomas, has obtained the prize for a figure of a "Jeune Enfant en Prière"; in medal engraving, M. Dausin, pupil of M. Ponscarre and M. Thomas, receives the prize for his medallion on the rather absurd subject, "Bienfaisance Allaitant le Génie à l'École des Beaux-Arts." In architecture, a pupil of M. Guadet, M. Berger, has obtained the prize for a design for the decoration of a public place. The second prize in architecture has been awarded to M. Duquesne, pupil of M. Pascal, for a "Galerie d'Exposition."

The death of M. Edmond Guillaume, the architect to the Louvre and the Tuileries, was briefly announced in our last number. This eminent architect was born at Valenciennes on June 24, 1826. At a very early age he entered the École des Beaux-Arts, as a pensioner of his native town, and studied in the atelier of Hippolyte Lebas. In 1855 he obtained the "Second Grand Prix de Rome" with a design for a "Conservatoire de Music and Declamation"; and the following year received the first "Grand Prix" for his design for an Ambassador's Palace at Constantinople. After fulfilling his term of study at the Villa Medici, he was commissioned on a visit of exploration to Asia Minor, and published the results under the title "Explorations Architecturales dans la Galatie et la Bithynie." At the Salon of 1863 he obtained a medal of the second class, and about the same time was appointed "Inspecteur des Travaux" at the Palais de Justice. Shortly afterwards, as the result of a competition, he was commissioned, along with M. Doublemard, the sculptor, to execute the monument to Marshal Marcey, in the Place Clichy. In 1866 he received the Cross of the Legion of Honour, and was elected a member of the Société Centrale. About this time he commenced the Hôtel de Ville of Cambrai, completed in 1875. In 1867 he received a medal of the second class at the Universal Exhibition, and in the same year was appointed Inspector of the Palaces of St. Cloud and Malmaison; he was appointed "Architecte des Bâtimens des Sourds-Muets" in 1870, and architect to the Archives Nationales in 1873; became member of the Society of Antiquaries of France in 1874; received another exhibition medal in 1878; was appointed architect to the Palace of Versailles and the Trianon in 1879; architect to the Louvre and Tuileries in 1881; Professor of the Theory of Architecture at the École des Beaux-Arts in 1884; and again received a medal in the exhibition of 1889. M. Guillaume, throughout a career full of occupation, exhibited unflagging energy as well as high artistic feeling in everything he undertook. Among his official work was the restoration of the "Salle du Jeu de Paume" at Versailles, and its transformation into a museum. He gained, in an international competition, the commission for a commemorative monument at Lima (Peru). He was twice appointed member of the "Conseil Général des Bâtimens Civils," and was five times a member of the jury of the architectural section of the Institute.

Among his works of architecture carried out in his private practice, and apart from his official duties, may be named the Hôtel Dusart, Rue Solférino; the Hôtel Brugué at Reims; the Hôtel Van Blarenbergh, &c. He also designed the tombs of Albert Joly at Versailles, of Auguste Magnat, and that of Baron Taylor at Père Lachaise. Of amiable character, though a little cold and reserved in outward manner, M. Guillaume was universally esteemed for his integrity as a man and his knowledge and ability in his profession. He was a scholar of the first order, and we owe to him a very excellent history of the art of ornament. He leaves a son, M. Albert Guillaume, who has already made a reputation as a humorous designer of great talent and originality.

Almost at the same time occurred the death of M. Mozet, an eminent contractor for public works, who had been the friend and collaborator of Viollet-le-Duc. He was engaged over the restoration of a great many of the Monuments Historiques: Notre Dame at Paris, the Cathedrals of Reims, Meaux, Noyons, and Senlis, the churches of Louveciennes, Marly, and Orgeval, the château of Pierrefonds, the ruins of Coucy, the Cluny Museum, and many others which give evidence of his intelligence and professional ability in carrying out such work. He was a judge in the Tribunal of Commerce, a member of the juries of the exhibitions of 1887 and 1889, a member of the Chamber of Commerce, and an officer of the Legion of Honour. He died at the age of sixty-nine, after having for thirty years filled a foremost place among the ranks of French contractors, and his death has been a great loss to the building industry of the country.

We have to record also the death of M. Rougetet, the sculptor, who obtained a "second medal" in 1892 for his fine work "Héro and Leander," exhibited at the Champs Élysées Salon in 1892, and to whom we owe also the monument to Greuze at Tournus. M. Rougetet was struck with paralysis while still young, and died in a hospital for incurables at Ivry, under very melancholy circumstances of destitution, in spite of the reputation which some of his works had acquired for him.

\* Many English readers may smile at this; but such apparently has been the impression made by the interior of Westminster on the mind of a French visitor; a fact which it is of interest to note.—E.D.



## THE ROYAL ARCHÆOLOGICAL INSTITUTE AT SHREWSBURY.

By the desire of the Shropshire Archæological Natural History Society the Royal Archæological Institute, as we announced last week, has this year chosen Shrewsbury and the district as the ground for its annual meeting. The last time Shrewsbury was visited by the Institute was in 1855, but great changes have occurred since then. Most of the men who were the leading archæologists have passed away, and some of the churches and other objects of interest have suffered from injudicious "restoration" or the hand of time.

In point of numbers the present meeting was no wise behind its predecessors, and a goodly company assembled in the Guildhall, on Tuesday, July 24, at the hour of noon. Here the Institute was formally received by the Mayor, wearing his scarlet gown and gold chain of office, who spoke of the pleasure of welcoming the Institute back to Shrewsbury after an absence of thirty-nine years. In the unavoidable absence of Viscount Dillon, V.P.S.A., President of the Institute, the chair was taken by Chancellor Ferguson, as senior Vice-President present, who, in a few well-chosen words, introduced Sir Henry Howorth, K.C.I.E., M.P., F.R.S., F.S.A., the President of the meeting. The President then delivered a most able and interesting address, in which he reviewed at length some of the methods of recent archæological research, and summarised the more general conclusions that have been arrived at.

After an adjournment for luncheon the members reassembled at St. Mary's Church for a perambulation of the town, under the guidance of the Ven. Archdeacon Lloyd, whose acquaintance with the antiquities of the place made him a most efficient demonstrator. St. Mary's Church, which was first inspected, is a large cruciform building with aisles to the nave, a western tower and spire, north and south porches, and a large chapel south of the chancel. It is chiefly of Transitional Norman work, the nave arcades being particularly fine. This portion of the church was boarded off on account of the repairs necessitated by the recent fall of the top of the spire and collapse of the nave roof. The south chapel is a fine and lofty addition of the middle of the fourteenth century. The chancel was intended to have been vaulted, but this was given up, and the design altered. A fine cross-legged effigy of a knight is the only old monument. All the fittings are modern. The east window contains the greater part of a very fine Tree of Jesse, of the middle of the fourteenth century, brought here from the now destroyed church of St. Chad, in 1788. The north window contains some excellent sixteenth-century foreign glass, with scenes from the life of St. Bernard, which was brought, with other glass in the south chapel, dated 1547, from the church of St. Severin, at Cologne, where it had been removed from Altenburg Abbey. In the sedilia are fixed three fifteenth-century alabaster panels representing the Baptism of our Lord, a clerk praying to the Holy Trinity and Our Lady and Child, and St. John preaching in the Wilderness. These panels did not belong to the church.

The Castle, which was next visited, contains little of interest save the arch of the Norman gateway, the much-altered shell of the thirteenth-century great hall, with a fine seventeenth-century roof and clearstory, and the Saxon mound on which stood the shell keep of Robert de Montgomery.

The old schoolhouse, built at the end of the sixteenth century, and now the free library and museum, is a very interesting structure, with quaint figures of two schoolboys in the dress of the time, flanking the entrance. The museum contains a few interesting things, but the important Romano-British city of Uriconium is very poorly represented, except by the usual pots and pins.

Of the other two churches visited, St. Julian's calls for no special notice, having been rebuilt, save the steeple, in 1749. St. Chad's collapsed suddenly in 1788, and is now represented only by a decorated chapel that stood on the south of the chancel, and by a recently-excavated bone-hole or crypt on the site of the north transept.

The many old half-timbered houses in Butcher Row, and elsewhere in the town, are remarkable for the late survival of Gothic detail. The traceried barge-boards and other portions are quite fifteenth century in character, but the frequent dates show them to have been carved at the close of the sixteenth century. A particularly good example beside the old Guildhall bears the initials D. LL., with a merchant's mark of the

date 1570. The Guildhall itself is an interesting building, erected in 1596.

After a brief adjournment for tea, a visit was paid to the fine fragment of the now destroyed abbey of St. Peter and St. Paul, the nave and western tower of its church, which escaped at the suppression through its being used by the parish. The architecture, which is chiefly Norman, calls for no remark, but there is a fine series of tombs, including several brought from St. Chad's church. The best of these is a figure, now in the north porch, of an elderly man in civil costume, with mantle, of a date *circa* 1370. Another figure, of a knight of late thirteenth-century date, has a modern brass above it, asserting it to be the effigy of Roger de Montgomery, who died about 1093. A short chancel and transepts have lately been added from the designs of Mr. J. L. Pearson. Of the abbey buildings nothing is left but a fragment of the south wall of the frater, with a beautiful octagonal reading pulpit of the end of the fourteenth century, with panels containing figures of saints. The inspection of the Whitehall, a fine Elizabethan mansion with charming garden and pigeon-house, the latter retaining its revolving ladder, concluded the day's proceedings.

In the evening, Mr. C. J. Ferguson, President of the Architectural Section, delivered his opening address to a large audience in the Music-hall. He reviewed briefly the different modes of building practised at different times, and especially referred to the extensive use of concrete construction by the Roman and Norman builders, and the manner in which it was made and built up.

Mr. W. H. St. John Hope followed, with an address descriptive of the arrangements of English monastic buildings, illustrating his remarks by a large series of ground-plans of abbeys and priories drawn to a uniform scale.

On Wednesday, the members started at ten o'clock for Pitchford. Here the church was first examined. It is a small Early English structure, with nave and chancel under one continuous roof, the division having been marked by the rood-screen only. The whole of the pews and other fittings are of excellent Jacobean work. The font is tub-shaped and coeval with the church. In the chancel is a good series of late alabaster incised slabs and a fine wooden effigy of a knight *circa* 1270, lying on a wooden tomb of the same date, with an arcade of trefoiled arches containing shields. The chief points of interest were indicated by the Rev. Thomas Auden, who acted as guide throughout the day. Close to the church is Pitchford Hall, which was also visited. It is an exceptionally large and perfect "black and white" house of the end of the sixteenth century, with characteristic carving of a much earlier style. The interior contains some good panelled rooms.

From Pitchford the party proceeded to Acton Burnell, where Mr. Auden described the very interesting parish church. This is a cruciform building without aisles, built by Bishop Burnell after the middle of the thirteenth century. The transepts seem to have been an afterthought. The chancel has some fine work in the east window and a rich trefoiled arcade on the side walls in which the windows are pierced. The transept, or transeptal chapels as they should more properly be called, have three-light windows in the gables and lancets at the sides, and are entered from the nave by richly-moulded arches. The nave is comparatively plain. One of the windows on its north side is very short, and has beneath it the marks of a wooden gallery. Mr. Micklethwaite pointed out that this was an example of what he had termed "high-side windows," the use of which seems to have been to a show a light towards the cemetery to drive away evil spirits. Such windows were usually accessible from the rood-loft, but in this case the window was too far away, and was reached from a special gallery in front of it. The chancel arch shows the cuts for fixing the rood-screen, and, just outside it, a small piscina proves the existence of the usual pair of altars on either side of the entrance. None of the old fittings remain, but there are some interesting tombs in the north transept, especially that of Sir Nicholas Burnell, 1382. That of Richard Lee, 1591, has a quaint figure of a little dog couched within one of the gablets that lie beside the effigy. The roofs are ancient. The Rev. Dr. Cox called attention to a funeral garland, of the same character as those which used to be hung up in Derbyshire and other districts over the accustomed seat of a deceased maiden.

A discussion took place as to the probability of an arch on the outside of the north wall of the chancel, with a little window looking into the church, having marked the site of an anchorhold.

The arch and window are contemporary with the chancel, but there are constructional difficulties as to the way in which they were covered, and the evidence has been observed by the recent building of a tower in the angle. A row of corbels on the east wall of the transept seems to point to the existence of some such dwelling as that of a recluse.

The remains of the Castle of Acton Burnell were next visited. These consist of the shell of a large square building with towers at the corners, of a type of dwelling intermediate between a castle and a house. The castle was built by Bishop Burnell in the third quarter of the thirteenth century, and, as pointed out by Mr. Hope, was divided longitudinally by a party-wall. On one side of this was the great hall, with cellars beneath, having at the east end the entrance, and at the other the screens with a gallery over. The other half contained the solar and other rooms, also built over cellars, in the west end of which was the kitchen, with a service stair to the hall floor. Between the eastern towers was a small chapel, now destroyed, and at the opposite end were the garderobes. Close by are the gable ends of a great Edwardian barn, in which tradition says was held the Parliament of 1283-4.

After luncheon the carriages were again entered for a visit to Langley Chapel. This curious little building, so well known for its reputed "Puritan" arrangements, though structurally sound, is in a most deplorable state of neglect, the floor and fittings being covered with a shocking accumulation of filth of every description. The windows are boarded up, and the roof covering having given way in places the wet enters freely and adds to the forlorn appearance of the building. It is now in the hands of Sir Frederick Smythe, Bart., who, although a Roman Catholic, might surely be asked to spend a few pounds in putting the roof into repair, re-glazing the windows, and causing the interior to be cleaned. The chapel seems to have been entirely rebuilt, except the east end, which is late thirteenth-century, in 1601, the old roofs of its chancel and nave being re-used. The original pews, pulpit, and reading-pew are of the reign of Charles I., but the altar and the seats and desks on the north and east sides of it date from the Restoration, when the chapel was partly refitted. Mr. Micklethwaite pointed out that the arrangement of the altar was not Puritan, as was usually stated, but one of those interesting compromises with the High Church party which were characteristic of the time. The Puritan arrangement was a long table set east and west, round which people sat, but here the table was a small one standing north and south, and the communicants knelt round it at desks placed along the walls.

After a glance at the arch of the old gateway of Langley Hall the party proceeded to Condober. Here Mr. Auden welcomed the Institute to view his own church, the chief features of which he pointed out. The chancel has been lately rebuilt and the two Norman transepts are the oldest parts of the church. The nave was rebuilt on the site of the older nave and aisles in the middle of the seventeenth century and covered by a remarkably fine hammer-beam roof of wide span. This has unfortunately been recently entirely "restored" in imitation of the old, of which only the westernmost truss is left. The windows too, have been completely renewed and apparently made "Gothic," and the panelled buttresses alone remain to show what an interesting chapter in the history of English church architecture has been hopelessly tampered with. The tower seems to have been rebuilt at the same time as the nave. The church retains no old fittings, but in the north chapel are several interesting monuments, including that of Thomas Owen, Justice of the Common Pleas, *temp.* Elizabeth. There is also a pathetic monument wrought with unusual power and skill to the memory of the wife and infant of the present owner of Condober, Mr. Cholmondeley, who himself designed and carved the beautiful recumbent figure.

By the kindness of Captain Cholmondeley, the present occupant, members of the Institute were allowed to inspect Condober Hall, one of the finest Elizabethan mansions in the county, with beautiful gardens and a valuable collection of pictures. In the evening the Antiquarian Section was opened in the music-hall by Mr. Stanley Leighton, M.P., F.S.A., who took for the subject of his presidential address the changed and ever-changing condition of the county as illustrated by its monasteries, castles, houses, and their inmates. Mr. Leighton also called attention to the singular lack in existing ancient houses of



their furniture and fittings; those now to be seen being in almost every case the result of modern collection. Mr. Micklethwaite then delivered an address on monastic life, in continuation of the subject introduced by Mr. Hope on the previous evening, in which he briefly reviewed the origin of monachism and the rise and growth of the different religious orders. He also showed from the Cistercian rule, which was practically a reversion, in all its austerity, to that of St. Benedict—what was the daily life of a monk. Mr. Stephenson followed with a paper on the "Monumental Brasses of Shropshire," which was illustrated by a fine and almost complete series of rubbings of all the remaining examples.

On Thursday morning, about one hundred members of the Institute and their friends proceeded by train to Shifnal, and thence in carriages to Tong, where the church was described by Mr. Griffiths. The building, which is chiefly of the fifteenth century, is a well-known example with an exceptionally fine series of tombs and recumbent effigies. The chief features of these were pointed out and described by Mr. St. John Hope. The three finest are of alabaster, and commemorate Sir Fulk Pembridge (circa 1410) and his lady, who is habited as a widow; Sir Richard Vernon and wife, circa 1452; and of Richard Vernon and Margaret, his wife, circa 1517. The Pembridge effigy is remarkable for the leather cap shown inside the tilting helm, which is also surmounted by a beautiful maiden's head, with long plaited "pigtail" by way of a crest. The charming Late Perpendicular chapel on the south side is full of interest. Besides its fan vault and pointed walls, it retains its original floor, altar-piece, and stone altar, over which are the marks of its "table" or reredos, with a painted dedication inscription and figures of the roof and SS. Mary and John. The inscription records the building of the chapel by Sir Arthur Vernon, priest, in memory of his father and mother, whose tomb stands under an arch on the north side. On the floor is the founder's brass, and on the wall above a half-effigy of him on a canopied bracket.

The presence of seven consecration crosses on the altar slab was ingeniously explained by Mr. Micklethwaite, who showed how the slab was an old one brought from elsewhere, and that two of the crosses had been covered by the table which stood on the altar. The chapel was formally consecrated on its completion, as is shown by four dedication crosses still painted on its walls, and when the altar was also hallowed, two new crosses were cut on it in advance of the reredos. In the vestry of the church is an embroidered pulpit or altar hanging of the time of Charles I., and with the plate is preserved a splendid crystal and silver-gilt covered cup of the sixteenth century—apparently a German drinking cup. Before leaving the church, Mr. Cranage called the attention of the members to the south arcade of the nave, which he showed, from the existence of the hood-mould, on the aisle side only, had originally formed the north arcade of the nave before the church was rebuilt.

After lunch the party drove to Lilleshall Abbey, where are the extensive remains of a house of Black Canons. The chief features were pointed out by Mr. St. John Hope, who called attention to the curious aisleless cruciform church and its remarkable division by screens, which could still be traced into (1) presbytery and choir; (2) retro-choir; and (3) nave, this last being further divided by a wall; and (4) its western part used as a separate chapel for guests and strangers. Mr. Hope described the results of extensive excavations made in 1888, when, amongst other things, a large Lady Chapel was traced on the north of the church, and pointed out the remains of the chapter-house, frater, and other buildings. In the evening the members were received by the Mayor and Mayoress at a conversazione in the Music Hall, where a complete collection of the maces and other insignia of Shrewsbury and the other Shropshire boroughs was exhibited. These were briefly described in the course of the evening by Mr. W. H. St. John Hope.

Friday morning was devoted to a meeting of the Historical Section in the Music Hall. The President of the section, the Rev. J. Charles Cox, LL.D., F.S.A., delivered the opening address, the subject of which was the history of Roman mining in Shropshire and other counties, with especial reference to workings for lead and iron. Sir Henry Howorth added some valuable observations on the sources of the various minerals used in ancient times. A paper was also read by the Rev. W. G. D. Fletcher, F.S.A., on the fine series of Municipal records belonging

to the town of Shrewsbury, some of which he also exhibited.

After an adjournment for luncheon the members drove to High Ercall church and Hall, which were described by the Hon. and Rev. G. H. F. Vane, and thence to Haughmond Abbey. The remains here were described by Mr. Hope, who pointed out the scanty ruins of the church, the chapter-house, the frater and its subvault, with the adjoining kitchen and the abbot's camera beyond, to this was attached a very fine hall of the first half of the fourteenth century, probably used as the infirmary hall, and served from the convent kitchen, with which it was connected by a pentise. The beautiful Transitional doorways into the church and chapter-house are remarkable for the fourteenth-century figures of saints which have been carved out of the jambs.

Saturday morning was occupied by the annual business meeting of the Institute, which was attended by members only. After lunch, carriages were in readiness to convey the party to Wroxeter, the site of the Roman city of *Uxionium*. The remains of the great *basilica* and of the fine series of baths that adjoined it were fully described by Mr. George E. Fox, who strongly urged the desirability of a systematic excavation of the site on the same lines as the operations carried out at Silchester. Large sums of money could be expended and scholarships founded for the prosecution of such researches abroad, while the investigation of the remains in our own country, which surely would yield part of its history, was systematically neglected. A move was next made to the parish church of Wroxeter, which was described by the Vicar, the Rev. R. Steavenson. Mr. Cranage pointed out the architectural features of the building, and suggested that the north wall of the nave was of Saxon date and the chancel Transitional with early English insertions. The tower is a strange mixture of used-up pieces of carving and mouldings, all Medieval, and may be made out of materials brought from the ruins of Haughmond Abbey. The chief features of the three tombs in the chancel, including a fine figure of a judge in his robes and collar of SS., the small "weepers" on a somewhat later tomb representing ladies with nosebags, and an effigy in armour, with mutilated hands concealed by sheet-iron gauntlets, were pointed out by Mr. Hope. By permission of Mr. R. A. West an opportunity was afforded the party of examining some interesting capitals and other Roman remains built up in his garden as a rockery.

On Monday, July 30, the members left Shrewsbury by the 10.5 a.m. train for Ludlow. Here the fine church, with its grand series of screens and tombs, its stained glass and stallwork, was described by the Rev. Prebendary Clayton. From the church the party proceeded to the castle, which was described by Mr. W. C. Tyrrell. The Norman keep has had its original arrangements obscured by the rebuilding of the north wall and staircase in the fourteenth century, but the fine thirteenth-century hall, with its complete appendage of offices at one end and the state apartments at the other, was examined with much interest, as was the curious circular nave of the chapel. After an adjournment for luncheon at the famous old inn, "The Feathers," the party returned by train as far as Craven Arms to allow of a visit to Stokesay. The history and principal features of this fine thirteenth-century hall and its appendages were described by the Rev. J. D. La Touche, M.A., who illustrated his remarks by an excellent series of drawings and ground plans. After an inspection of the little church hard by, which contains a fine canopied double pew of Jacobean date, the party returned to Shrewsbury by train. In the evening the concluding meeting of the Institute was held in the Music-hall, when votes of thanks were passed to the several gentlemen who had so kindly thrown open for inspection their houses and churches, &c., to those who had ably elucidated and described the various features of interest. On Tuesday the members assembled at 10 a.m. and drove to Buildwas. Here the ruins of the Cistercian abbey were demonstrated by Mr. W. H. St. John Hope, who pointed out the various evidences of the singular division of the church into presbytery, monk's choir, retro-choir, and choir of the *conversi*, and explained the reason of the division wall built in front of the piers throughout the length of the church. Mr. Hope called attention to the admirable example afforded of the normal and primitive Cistercian arrangement, which he also suggested had continued till the Suppression, and not been disturbed as at Fountains and Kirkstall. Though the church only equalled in length the

nave of Kirkstall, it presented a miniature representation of all the original arrangements of that interesting church. After inspecting the chapter-house and other remains of the conventual buildings, the party resumed the journey to Wenlock, where a halt was made. After lunch a visit was paid to the extensive ruins of the great Cluniac Priory of St. Milburga, which were described by Mr. W. H. St. John Hope. By the courtesy of Mr. C. Milnes-Gaskell an inspection was permitted of the very interesting fifteenth-century group of chambers forming the east side of the former cloister, known as the "prior's house." Mr. Hope showed that this really consisted of at least three complete sets of chambers, communicating by a common passage or gallery built over the east cloister alley. After a brief inspection of the parish church, which was described by Mr. Cranage, and of the maces and charters of the Corporation of Wenlock the party returned to Shrewsbury, and so the meeting came to a most successful end. The members were favoured by fine weather throughout, and the arrangements made by the committee were excellent and most ably carried out by the Hon. Director, Mr. E. Green, and the Hon. Secretary, Mr. M. Stephenson. The most commendable punctuality was maintained throughout. Next year we believe the Institute is to meet in Yorkshire, perhaps at Scarborough, if satisfactory hotel arrangements can be made.

#### BRITISH INSTITUTE OF PUBLIC HEALTH:

THE ENGINEERING AND BUILDING CONSTRUCTION OF THE HOUSES OF THE COMMONS.

The meetings of the Engineering and Building Section of the British Institute of Public Health, which were held at King's College, commenced on the 26th ult., when Professor Banister Fletcher, President of the Section, delivered his Presidential Address, the greater part of which was published in the last issue of the *Builder*.

Mr. Douglass Mathews, F.R.I.B.A., commented upon several of the points of the President's address. It was a matter for satisfaction, he observed, that before long they would have a less number of 9-in. walls. Under the Act which would shortly come into force, one story would be the limit, and to that extent they would get rid of what had no doubt been a great source of danger to the health of those who occupied houses with 9-in. brick walls. As to plastering, he agreed that of late there had been an improvement in this direction in London, owing to the care now bestowed in the mixture of the material, and he thought the authorities were to be commended for insisting upon the use of better material. He could not join the President in his condemnation of the "wash-out" closets, but quite agreed with him as to the valve closets, as well as with his remarks upon the necessity of having a three-gallon flush. He supported the idea of having public baths and washhouses in the City of London, and was of opinion that a site might be secured on the Thames for such a purpose. Most people were in favour of wood-paving, as against asphalt, but he always looked upon wood as an absorbent; if something could be done to make it less so, wood might be very valuable for general paving.

Alderman Clements (of Henley-on-Thames) thought that for some years they had been greatly in error in attaching importance to large-sized drain-pipes. His own experience was that a 4-in. glazed stoneware pipe was large enough for any house-drainage. He also emphasised the same opinion with reference to the sewerage of towns. Our sewers, generally speaking, were far too large. At Henley they had adopted Mr. Shone's pneumatic system of drainage; they had no larger pipe in any part of the town than 7 in., and they never experienced a blockage. In connexion with building construction, he pointed out the necessity of the site of every structure—whether that building were intended for a dwelling-house or for workshops—being covered with cement concrete, and hoped that would be one thing which would be insisted upon in the future. As to the ventilation of sewers he hoped that the old-fashioned ideas of doing this work by street-gratings were now exploded, and that, as a rule, pipes up the sides of houses would take their place. Mr. Clements also advocated the use of wood-block flooring and cement skirting, especially on the ground floors of houses.

Mr. J. Hinton was of opinion that the ventilation of large blocks of houses needed attention, and not only that of street sewers. The size of drain-pipes depended upon the fall. He believed in a proper size to a proper fall.



Mr. Lindley urged that for the ventilation of sewers it was necessary to combine street gratings with pipes run up the sides of houses.

Mr. Kimber (Plumstead) expressed himself in favour of wood paving, but impressed upon the congress the necessity of seeing what could be done to make it less unhealthy.

Mr. Charles Jones, M.Inst.C.E. (of Ealing), read a paper on "Dust and Refuse Disposal." The writer commenced by saying that the rapid increase of population in a very large number of towns, with the consequent relative increase in the peculiar mixture known as "dust" or house refuse, emphasised the importance of the subject of its disposal.

After giving a brief reply to the question "What is dust?" Mr. Jones turned to the important question—What is the best mode of dealing with house refuse? The method now principally employed, viz., treatment by fire, was not a new one, for back in what were sometimes called the "dark ages" fire was the great remedial agent. He could not but express the very strong opinion that at the present, at any rate, it was to the furnace that they had to look for the best means of dealing with the house refuse difficulty. In his own district there were not a few houses where the whole of the house refuse, including vegetables, was destroyed in the kitchen, and that which could be done in some few houses, where care was taken, could be done in the bulk if a proper recognition of the economics of the kitchen were fairly impressed upon the minds of those who served them in their homes. They were, however, necessitated to deal with things as they found them, and must consider the best mode of removing house refuse quickly and economically. The material itself was a sanitary nuisance, and he deprecated the systematic picking over or sorting which was once the general custom, and was still carried on at one or two depôts. It was now some twenty-five years since the first destructor furnace was erected, and although for a long time difficulties had to be dealt with and opposition was created, nothing like a reasonable opposition could now be raised. Some fifty of the most important towns had successfully adopted this mode of treatment, and in some portions of the Continent and in the Colonies the same work was being carried out.

After naming several makers of destructors, the reader of the paper said the furnaces might be divided into two classes—a low temperature and a high temperature, the one dealing with the refuse at a moderate heat, and at a minimum expense, and the other destroying somewhat more per cell, but at the same time incurring a very high expense per cell per annum. The low pressure utilised the secondary furnace, or fume-cremator, for the destruction of the gases (and should he say for utilising the products of the cells?) which would otherwise pass up the shaft, whilst the high pressure professed to deal with the gases in the cells themselves. His own experience, which had been with the low temperature for a cremator, induced him to give the preference to that particular mode, the very simplicity of the apparatus being an important feature, in his own view; and although he was not getting quite so much steam-power as might otherwise be obtained, he carried out most effectually the object he had in view in the destruction of the refuse, and the utilisation of its products, at the lowest possible cost. As to the utilisation of the heat arising from the crematory process, it was the duty of every municipal authority to make use of all that could be utilised, but the sanguine views taken by many people of the high value of the benefits to be derived in this direction only tended to disappointment in the result, and an adverse opinion upon a most useful municipal appliance. That a small amount of steam-power might be obtained there could be no doubt. It was evident, however, that the question of horse-power was an extremely variable one, and, looking at the matter from an electric lighting point of view, no installation would be erected which depended upon the amount of heat derivable from the refuse destructor. At Ealing, where the clinker was also used to its fullest extent, they were laying down a very complete electric light installation at the sewage works. The installation would be complete in itself, but would be so connected with the destructor that the surplus heat, be it more or less, would be entirely utilised. They looked forward to this installation being a great success, not only as an electric light installation, but also as the first district where the destructor had been made conjointly a part of the system.

A paper on "Electric Lighting as a Health Agent," by Mr. W. H. Preece, F.R.S., was

next read. Mr. Preece said that the most prominent application of electricity was for lighting purposes, and the improved sanitary conditions of an establishment so lighted must be apparent to all. The writer referred to the necessity of electrical engineers devoting their time and experience to solving the problem of cheaper production. It might, he said, be asked what modifications were necessary in electric light stations whereby a third unit could be produced and at the same time pay a fair dividend to the proprietors. Water power was practically unavailable in this country, and steam was the principal motive power. Why not use gas itself as the prime mover? After dealing with the results obtained by the gas-producing apparatus of the Illuminating, Heating, and Power Gas Company, Limited, Manchester, Mr. Preece said that one of the greatest problems the City of London had to solve was that of local transit. The present congested state of the streets rendered it imperative that other methods of transit whereby the ever-increasing traffic of London could be properly dealt with might be adopted. In this connexion he gave a detailed account of the City and South London Electric Railway, and alluded to the number of new lines in and across London based on the same principle, and already authorised by, or seeking powers from, Parliament. This line had many advantages which would commend it to those who had the question of the improvement of public health under their especial consideration. The entire absence of smoke and dirt, and unpleasant odours, only too prominent on other underground lines using steam locomotion, was in itself an immense advantage in adding to the comfort and convenience of passengers using the line. Mr. Preece spoke of the treatment and disposal of sewage as one of the principal sanitary questions of the present day, and pointed out the advantages of the process known as Webster's Electrical Process for Sewage Purification. There were at present, in the writer's opinion, however, certain disadvantages in connexion with this process, which must be eradicated before the engineers could consider this method of treatment perfect.

"Softening Public Water Supplies" was the title of a paper read by Mr. W. G. Atkins, C.E., who observed that Dr. Clark's process of softening by lime was the only practical method yet discovered. The sixth report of the Rivers Pollution Commission on the Domestic Water Supply of Great Britain, he said, was a remarkable volume, and contained analyses of water from all parts of the kingdom. Every system of filtering, &c., was carefully examined by the Commission, and the lime process strongly recommended for waters containing carbonate of lime, this being the large majority of waters in England obtained from rivers or wells. The process, the writer claimed, exerted a greater purifying power than any system of filtration only, and, if properly carried out, the water contained no trace of the lime which had been added; it was purified, and the total solids were greatly reduced. He held that objections that had been urged against the lime treatment proved to be unfounded if the process were accurately carried out. As to the savings effected, Mr. Atkins said that when water was softened the consumption of soap was reduced by one-half, tea was 25 per cent. stronger, and incrustation in boilers and kettles was entirely prevented and fuel saved. The cost of softening was one farthing per 1,000 gallons for interest on plant, and one farthing for working expenses, making together 2d. per 1,000 gallons. An average household could for 2d. effect a saving worth 1s. 6d. per week, and a workman's family, for 4d., one of 6d. The first cost of plant was proved in a large town to be 16s. per house, and as each household obtained savings valued at 1s. 6d. per week, or 3l. 18s. od. a year, the investment in softening the plant, after deducting 1s. 1d. for working expenses, might be said to pay over 400 per cent. per annum. Those figures were based on strict experience, and were the result of many years' careful observation. Mr. Atkins recorded the adoption of Dr. Clark's system of softening hard water supplies, and, in conclusion, said the time would come when it would be as rare to find a town supplied with hard water, rather than soft, as it was at the present time to find a town without any water supply at all.

Mr. Fraser (of Kingston-upon-Hull) said he was attending the congress for the purpose of learning something with reference to refuse destruction and subjects relating thereto. He wanted to take back some valuable information, so that he could impress upon the northern mind the wonderful advance of the southern mind, and

the advantages possessed by southerners. He hoped his colleagues in Kingston-upon-Hull would be persuaded that the only way to get rid of the house-refuse was to destroy it by fire.

Mr. Alliott, who said he had been interested, with a few others, in the destruction of refuse by fire from its first inception, referred to the varied composition of refuse, differing as it did in various districts, in the several parts of those districts, and in the summer and winter seasons, and said that regard must be had for these conditions. Where the refuse was difficult of treatment it should be considerably dried before any attempt was made to burn it, but where they got material of the better class—in fact, as it approached to the character of coal—so they might treat the material more and more as they did coal. At the present time a destructor was being erected at Birkenhead, in which some of the cells were constructed to take away the products of combustion from that part of the furnace which was the hottest, while some of the other cells or furnaces were being constructed so that the products of combustion should pass over and dry the material before it passed to the furnaces. In the early forms of destructors it was possible to obtain steam-power from the refuse. Southampton had a destructor, which had been in use some twelve years at least, and from the very commencement they had had sufficient power to work their Shone ejectors, which were used for the purposes of raising and discharging sewage. In addition, they had let off compressed air to a neighbouring town, and had found steam for electric lighting purposes. Where they got improved material they could also supply a large amount of boiler power. For most purposes for which the heat provided by destructors could be used there was this disadvantage, that the destructor was obliged, in order to work economically, to work day and night without stoppage, whilst the heat, in the shape of power, was only required for a small portion of the twenty-four hours. In further remarks, the speaker dealt with the storage which this state of things necessitated.

Mr. G. Watson (of Leeds) described, with the aid of some diagrams, the Horsfall's Patent Refuse Furnace.

Mr. Monks (Chairman of the Sanitary Works Committee, Warrington) related the steps which had been taken in that town towards the destruction of refuse, and said they had managed to hit upon what he ventured to think would prove a great success. Their furnace had been at work for twelve months, and was destroying twenty-four tons of refuse per twenty-four hours.

Mr. W. Spinks also referred to the Warrington destructor, and said that Dr. Carter Bell had analysed the gases from it, and there was no trace of carbonic oxide.

After a few remarks from Mr. H. Ransom, C.E., and a brief reply from Mr. Jones, the section stood adjourned.

On Friday, Mr. Lewis Solomon, F.R.I.B.A., read a paper entitled "A London Architect's Troubles with the Local Sanitary Authorities." At the outset he pointed out that an architect was assumed to try and do sanitary work satisfactorily and economically, while each Local Authority had certain special requirements with which he must comply. He then proceeded to deal with the varying requirements of the many parishes in London, with reference, among other things, to the size of drain-pipes, pipe-bedding, the inspection chamber, inlets, outlets, apparatus, connexions to road, and the testing of pipes. Considerable difficulty lay in the fact that the same set of by-laws was not used by the County Council, which governed the whole of London, and each separate vestry, which governed only a part of London. One great trouble that almost all architects and builders complained of was the "red tape" of the subordinates, who would not go out of their routine to save considerable waste of money. In some parishes a certificate that the drains were to the satisfaction of the Sanitary Authorities was insisted on; in others they absolutely refused to give a certificate at all. The powers of the local vestries and the London County Council, if enforced, seemed absolute. Fortunately, however, these powers were used with discretion in most cases. Some of the by-laws of the County Council, the speaker further pointed out, were quite impracticable. The object of this paper was to get some uniform system of regulation. The main requirements, such as sound and sufficient work, the writer argued, should be alike in all parishes; while minor matters, such as special apparatus, should be left to the discretion of the party doing the work. He suggested that a committee be appointed to treat with all the London vestries



for a uniform set of rules in regard to drainage work.

Mr. W. Kaye Parry, M.A., submitted an interesting paper on "Sewage Effluents." The author stated that it was not his intention to review the vexed problem of sewage purification, but to elicit information with a view to placing the question of sewage effluents upon a more rational basis. Having alluded to the causes which contributed to bring the subject to its present acute stage, he proceeded to trace the successive steps which had marked the evolution of the sewage problem. The various Royal Commissions which had investigated the condition of the Thames and other rivers were referred to as illustrating the history of sewage purification in its relation to river pollution. The writer then directed attention to some of the practical aspects of the pollution difficulty, and propounded a series of questions to which he said authoritative answers were demanded. The possibility of safely discharging crude sewage into rivers of relatively large volume was referred to, and the opinions of Professor Percy Frankland and other chemists were quoted. The author also alluded to the bacteriology of sewage effluents, with special reference to the vitality of the typhoid bacillus in river water; in this connection the Massachusetts experiments were briefly touched upon. The pollution of the foreshore of sea-side health resorts was considered, and the necessity for legislation for the protection of the coast-lines was insisted upon. Tidal estuaries, in the writer's opinion, came under the same category, and the familiar case of the River Thames was cited as an example. The paper then dealt with the position of the sewage purification problem up to 1884, prior to which date, it was pointed out, the bacteriology of sewage had scarcely received any attention. The last decade certainly marked the dawn of a new era, in which the study of biology, both of water-supply and sewage, was assuming an ever-increasing importance. The researches of the French chemists and of Warrington were said to throw a flood of light upon the real effect of intermittent filtration. Standards of purity for effluents were advocated, the recommendations of the Rivers Pollution Commission were briefly criticised, and two or three other practical alternatives were offered, including a series of negative tests suggested by Professor Hartley, F.R.S. Analytical data were, in the writer's opinion, somewhat illusory, as evidences of the propriety of permitting the effluents which had been analysed to be delivered into rivers and other water-courses. The value of bacteriological examinations was referred to, with special reference to the alleged advantage of producing by purification a sterile effluent. In the remainder of the paper a few other debatable points, such as the necessity for land treatment as a supplement to chemical methods of purification, and the possibility of dealing with the discharge from storm overflows, were mentioned.

Mr. James Thomson, C.E., had promised to open a discussion upon "The Sanitation of Flats," but was unavoidably prevented from attending.

Mr. J. Trenner (Chairman of the Law and Parliamentary Committee of the Holborn Board of Works) said he was particularly struck with the observations of Mr. Solomon as to the want of uniformity existing among Local Authorities, and expressed his willingness to do what he could to bring about a conference with a view to getting uniformity of by-laws.

Mr. Kimber (Plumstead) referred to the experiments being made by the London County Council at Barking in the sand filtration of sewage effluent and hoped they would prove thoroughly successful. He agreed that the discharge of sewage effluent into the river was injurious, and said he trusted the Bill now before Parliament dealing with the matter would pass.

Mr. Spinks spoke of the difficulty of dealing with trade effluents, and, touching upon the question of the pollution of rivers used for drinking purposes, cited the case of an outbreak of enteric fever on the Tees, which was traced to the water supplied by two Authorities whose intake was below a point where sewage was allowed to enter the river. With regard to the subsequent filtration through land, in the north of England that was a difficult question, on account of the absurd values placed upon land by the owners of it.

Mr. Lindley thought great importance lay in the fact that "prevention is better than cure." In his opinion Urban Authorities should not only have power to watch and control the carrying out of the drainage of houses, but that they should control those making alterations to the drains to

give notice of their intention, so that the work could always be properly superintended.

Mr. Hannam (Leeds) alluding to the different systems of traps, &c., adopted by various authorities, said that in Leeds they used a specific kind of trap, and refused to allow any other. It seemed to him extraordinary when he went into a suburban district to see a Local Authority using the very thing they were debarred from using in a place like Leeds. He urged that some uniform system should be adopted.

Mr. J. B. London described the trouble which Coventry had experienced in the question of its sewage disposal, and the successful opposition of the Lord Lieutenant of the County to a scheme which had even been approved by the Local Government Board. They would, he said, have to apply for a further extension of time for dealing with the matter. They seemed there to be "between the devil and the deep sea." They wanted to remedy the nuisance already existing, but were not allowed to because they proposed to turn their effluent into the river.

Dr. Anthony Roche (Dublin) condemned the practice of many public institutions in discharging typhoid and other such organisms into the public sewers without the least attempt, or in some cases only feeble attempts, to destroy those organisms.

Mr. Bailey (Leeds) said that in that town they were trying to improve their system of irrigation. If it could be proved that sand filtration was better than irrigation he should be glad of information on the subject. They wanted to get rid of the solid matter that was injurious, and make it beneficial, and to know how best to filter or clarify the water.

Mr. Turnbull (Bedford) was surprised to hear the last speaker's remarks, seeing that what he believed to be the best system of sewage treatment originated in that very neighbourhood. He referred to the Carbonised Refuse System of sewage purification, invented by Mr. Jagger, of Leeds, and now being successfully applied at Baldon, in Yorkshire.

Mr. J. H. Dyer (of Alton) also spoke, and was followed by Mr. Brown (of Burgess Hill), who referred to the success with which he had managed a small sewage farm for some four or five years in that district.

Mr. Kaye Parry and Mr. Solomon having briefly replied on the discussion, the section again stood adjourned.

On Monday, Mr. Campbell Douglas, F.R.I.B.A., opened a discussion on "The Planning of Fever Hospitals," with an exceedingly able paper. The growth of our large towns, he said, was every year making it more and more necessary to battle with all kinds of sicknesses, and especially with fevers and other infectious diseases. For this purpose there ought to be in all cases power for municipalities to erect and maintain hospitals, supporting them from the rates. The late competitions for the two fever hospitals in London had brought out many interesting points in planning—some to be commended, possibly some to be avoided. After referring to the scope which existed for the skill of the architect in planning such an institution, the writer said his object was to state some general principles which should be attended to in any well-considered plan. Dealing with the question of locality, he said that in the case of a large town or city he saw no reason why the building should be placed very far away, for fear of risk to the public health; in fact, it was necessary for the hospital to occupy a central situation, because many patients might suffer seriously if they had to be conveyed some miles to it instead of to one at hand. He next spoke of the nature of the site, and coming to the subject of general arrangement, said that a fairly accurate knowledge of the daily routine of such institutions was the best guide as to how the various parts were to be relatively placed. Convenient access to all portions of the administrative departments must be observed, so that they might be easily reached from the outside without coming in contact with the wards. The wards should, in this country, be placed with their long axes lying N.W. and S.E., as this would ensure the maximum of the sun's rays in a land where they had not too many of them. After the sun, fresh air by means of ventilation was the chief point which claimed attention. As to the distance at which wards should be placed from each other, he did not think there was any hard-and-fast rule at which this might or ought to be fixed. Obviously, the fewer patients that were placed on the acre the greater must be the expense in ground, construction, and upkeep, as well as in management. It was doubtless true that that hospital where the

greatest percentage of cases was cured was the cheapest, if one considered the value of human life, but it did not follow that the most expensive hospital was thereby the most efficient. Common-sense enlightened by knowledge would direct where and how the kitchen and various food apartments should be situated, and so also with regard to the washing-houses and laundry, the mortuary, and the facilities for post-mortem examination. But it would be advisable that all important hospitals should be provided with a well-furnished laboratory for microscopic research and another for bacteriological preparations. The question of the number of patients to be accommodated per acre depended, the writer held, mainly on the system of ventilation adopted. After referring to certain interesting features of the Belvedere Fever and Smallpox Hospital at Glasgow, the City Fever Hospital of Edinburgh, the new Hamburg-Eppendorf Hospital, the Urban Hospital of Berlin, and Virchow's fever hospital for children at Berlin, Mr. Douglas remarked that it was not easy to say with certainty what ought to be the cubic space allowed per bed, because he thought it was very much a question of the supply of fresh air. It seemed to be the commonly-received opinion that somewhere about 2,000 cubic ft. should be allowed per bed, and that not less than 3,000 cubic ft. of fresh air should be allowed per hour. Obviously it was the business of the architect to place that 2,000 cubic ft. of fresh air as conveniently as possible within the patient's reach. In other words, it should not be so much above him as around him. The writer emphasised that in a model hospital the wards should stand above a thoroughly dry and well-ventilated upper story. He then dealt with the construction of the walls, the floors, the ceilings, and the windows. He thought means should be used for the ventilation under the beds being more thorough than it often was, and also that there should be no parts in the wards where the air stagnated when some management might prevent this being the case. Care must be taken that the water-closets were abundant and classified, that no healthy person should use those provided for patients, and that suitable places should be given for the sanitary and effective disposal of all discharges. As to heating, personally he liked open fire-places where they could be had, but obviously they would not suit large wards, and the artificial system of hot water or steam-heated pipes would have to be adopted, or warmed air might be forced into the wards. Upon the question of accommodation the writer said this should be provided for one per 1,000 of the population in a normal state of health, but it would be wiser to provide for a half more.

"The Architectural Features of Elementary Schools from a Public Health Point of View" was the title of a paper read by Mr. T. J. Bailey, F.R.I.B.A., Architect of the School Board for London. The writer said that the crowding together of large numbers of families on small areas of land had led to the necessity of erecting, in some cases, schools of an exceptional size. He referred to the schools built in the earlier days of school boards, and pointed to the growth in this direction during the last twenty-one years, that being just the time since the first school built by the School Board for London was opened. The weak points of the earlier schools were:—(1) The want of access to the classrooms independent of the way through the main room, to avoid disturbance of the classes; (2) The need for dividing up the main room to isolate the classes; and (3) The distressing and bad effects of back-lighting. As to the sites, many of the earlier schools were built on such small plots of land, frequently almost entirely back land, that their light and air suffered seriously. This was not likely to occur in the future, as the Education Department now required that there should be a minimum of 30 square feet of open playground for each child. This requirement insured that the site would be sufficiently open and airy for its purpose, and to secure that the offices were far enough away from the main building as not to commit a nuisance. Mr. Bailey then proceeded to describe the Hugh Myddelton School, opened by the Prince of Wales last December, and he stated among other things that he had been in and out of that building many times during the last winter, and there was an entire absence of what was known as the "school smell," with which all who knew the schools of twenty years ago were familiar. It was not much to be surprised at, considering what schools were when school boards began their work, that so much development had taken place in so short a time.

Mr. E. T. Hall, F.R.I.B.A., after referring to



the difference of opinion which existed among architects as to the best position for the administrative portion of a hospital, in respect of the hospital itself, said that a great point which Mr. Douglas touched upon was that of getting sunlight and air into the wards. The getting of as much sun as possible upon all the walls was of the gravest importance. The reader of the paper also said there were places where the air stagnated. He (Mr. Hall) thought it was well to put a window close to the angles of the room, so that both sun and air could be obtained. With regard to the danger to public health, he believed statistics showed that at a distance of 40 ft. from an infected building there was no contamination whatever. Of course, in the surrounding area it was very desirable to have trees, and therefore in the choice of site a rural situation was preferable. Speaking on the subject of ventilation, Mr. Hall expressed himself in favour of pure and undiluted air coming straight into the rooms as much as possible. He had heard that where windows were open close to the ceiling in fever wards, and there was a through current, the duration of a scarlet fever case could be shortened some six or seven days as compared with a room where such facilities did not exist. If that were so it said much for natural ventilation. On the other hand, he was told that in Glasgow Infirmary equally good results had been obtained by artificial means of propelling air and heating that air artificially as it went in. Mr. Douglas had spoken of the desirability of having open stories below the wards. The Metropolitan Asylums Board insisted upon that condition in their modern hospitals, and it seemed to him very important that there should be a through current of air underneath the ward.

Professor Roger Smith, F.R.I.B.A., said the point which had always struck him with regard to hospitals as requiring determination was that of ventilation. If one considered the great difference between summer heat and the extreme cold of a keen winter, and the dryness of one period and the dampness of another, it seemed very difficult, if they depended solely upon open windows, to devise a scheme of thorough ventilation. He could not but believe that with a climate like ours it was almost an essential that there should be a good trustworthy means of artificial ventilation, which at any rate could be relied upon during the night and throughout bad weather. As to the situation of the administrative portion of the building, it had always appeared to him to be wise to keep it as far as possible away from the sick wards. The result of the recent competitions, however, had certainly shown that the authorities did not hold that view, the successful plans in both instances being distinguished by having their administrative portion in the most convenient position; that was to say, in the centre of the plot of land, but with sick-wards on both sides.

Resolutions were then passed in sympathy with the objects of the Congress and certain of the opinions expressed in the course of the discussions. The following was among those adopted:—

"Being strongly of opinion that more information is required on all sanitary appliances, ventilation, and sewers, and also on matters connected with building construction, this section urgently recommend this Congress to appoint a small standing Committee with power to act until the next Congress. That such committee, by circular or otherwise, appeal to all local authorities throughout Great Britain and Ireland to aid them in the work; and that they also appeal to the City companies and to other bodies and individuals for funds in making the necessary scientific researches. That such committee from time to time make reports of the work they are doing."

The last paper read was by Mr. G. Binswanger, M.I.E.E., on "Electric Power, Heating, and Lighting, with Demonstrations and Notes on their Possible Influence on the Architecture of the Future." This was commenced at Monday's sitting, but time did not allow of its completion until the following day. Mr. Binswanger, in a very interesting way, showed some of the latest developments of electrical science, mainly in the field of domestic appliances, with a view to discussing the advantages they might offer to architects seeking to improve the present ordinary methods of motive power, heating, lighting, ventilating, cooking, &c. He claimed, among other things, that, if they called electricity to their aid, a house could be built without flues, without chimneys, without hot-water pipes; and yet perfectly heated, perfectly ventilated, and with perfect cooking arrangements. As to cost, he held that it was not excessive, or beyond the means of the moderately rich, even at the price

at which the current was being generally sold; but there were sufficient indications and grounds at hand to lead them to expect that one day electricity would also supply energy for light, power, and heat to the poor.

On Tuesday Professor Banister Fletcher brought up seven important resolutions, one of which insisted upon the necessity of providing municipal baths for the City of London, another upon the necessity of the sanitary inspection of railway carriages, and a third upon the need of further sanitary research, especially in relation to sewers and to building construction. These resolutions were remitted for further consideration.

#### BUILDERS' BENEVOLENT INSTITUTION ANNUAL MEETING.

THE forty-seventh annual meeting of this institution took place on the 26th ult. at the offices, 35, Southampton-row, Bloomsbury. Mr. George Plucknett, J.E. (hon. treasurer), occupied the chair, supported by Messrs. Thomas Stirling, C. Bassell, Robt. Perkins, and other friends of the charity.

Major Bruton (the Secretary), read the annual report, which stated that the committee consider the Institution is prospering, but they do not withhold the fact that it needs increased income, so as to provide for all those who, from unavoidable causes, are of necessity obliged to seek its benefits. Thus for want of sufficient income the committee are unable to recommend for election all who apply and are eligible; this being the more to be regretted as most of them are of an age which pleads for immediate relief. There are doubtless many builders in the Metropolis and its environs who are in easy circumstances, but who have never contributed to the funds of the charity; nevertheless the committee hope such persons may be induced to subscribe, as contributions from them would secure provision for all fit applicants. There are now fifteen men and thirty-three women depending upon the institution. The preponderance in the number of females is in consequence of the widows of pensioners having been made pensioners on the decease of their husbands, in accordance with the rules. During the past year five male and two female pensioners have died; one male and three female pensioners have been elected. The late Mr. Thomas Robinson, formerly a partner in the firm of Messrs. William Cubitt & Co., has bequeathed £1,000 to the institution, which, according to the rules affecting legacies, will be invested in Consols, and added to the other funded property belonging to the charity. The committee also express their thanks to Mr. George Haward Trollope for the successful exertion he made in his Presidential year to obtain a substantial sum for the Institution. The committee had the gratification to intimate that Mr. Basil Pym Ellis, of the firm of Messrs. Lucas & Aird, had consented to be the President for the ensuing year, and that he would preside at the annual dinner to be held on November 15 next, in the hall of the Worshipful Company of Carpenters, London Wall.

Mr. Thomas Stirling moved the adoption of the report and balance-sheet.

Mr. Robert Perkins seconded the motion, which was agreed to unanimously.

The thanks of the meeting were given to Mr. G. H. Trollope for his support and services during the past year, and votes of thanks were also passed to the Vice-Presidents and Trustees, and to Mr. Plucknett for his valuable services, he being again re-elected Treasurer.

A vote of thanks was passed to the committee, and the retiring members were re-elected, with the addition of Mr. Trollope. Thanks were also voted to the auditors, who were re-appointed.

On the motion of Mr. Stirling, Mr. Basil Pym Ellis was appointed President for the ensuing year, and a vote of thanks to the Chairman closed the proceedings.

ESSEX ARCHEOLOGICAL SOCIETY.—The annual excursion of the Essex Archeological Society took place on the 20th ult. The parishes visited were:—Broomfield, Great Waltham, Pleshey, High Easter, Mashbury, and Chignall Smealey. Mr. Chancellor described, architecturally and historically, the several churches and other buildings brought under the notice of the visitors. Mr. G. F. Beaumont read a paper, prepared by Mr. J. Horace Round, on Pleshey Mount. The Rector of Chignall Smealey (Rev. W. Gibbins) read a paper on his parish church. Thirteen new members were elected at the general meeting, and Colonel Brandil was chosen to sit on the Council. A resolution was carried by acclamation protesting against the ten Essex parishes now forming part of the Bishop of Stordford Parish Law Union being handed over to Hertfordshire.

## Illustrations.

### VIEW OF RIEVAULX ABBEY.

THIS is the view of Rievaulx which should have been published in our issue for July 7, along with the description and measured drawings of the Abbey given under that date; and which, as explained at the time, was delayed by an accident in lithographing.

The drawing, by Mr. J. A. Slater, shows the view of the ruins looking eastward from the crossing.

### GLASTONBURY ABBEY.\*

GLASTONBURY will always have a special interest as being the reputed site of the introduction of Christianity into Britain. Into the early history of the spot, however, there is not space here to enter; it has already been given in full in other works (Warner's "History of Glastonbury," and Professor Willis's "Architectural History of the Abbey"), and to these the reader is referred. The chief points in this history may be put as follows:—The landing of the twelve disciples of St. Philip, with Joseph of Arimathea at their head; the foundation by them of the Wicker Church; its dedication to the Virgin, and its discovery by a miracle in 166 by two missionaries sent by Pope Eleutherius. King Ina founded a monastery in the seventh century, which was ruined by the Danes. It was afterwards rebuilt by Dunstan, who "repaired all that the wars had ruined, by the liberal help of the Kings Edmund and Edgar,"† and was appointed the head of the Benedictine foundation in 940. The church was again rebuilt or enlarged by the Norman Abbots, of whom the first was Turstinus, 1082, and this church was consumed by fire in 1184, on May 25, St. Urban's Day.

This short epitome of the Abbey's history brings it down to the period from which the present ruins date. It must be borne in mind that there were, from the time of King Ina's foundation, two distinct churches; one known as the *Vetus Ecclesia*, built on the reputed site of the early Wicker Church of St. Joseph; and the *Major Ecclesia*, eastward of it, which was planned in the usual manner of a Benedictine minster.

The ruins, as they exist at the present time, are those of the great church and the chapel of St. Mary, or the Lady Chapel, detached originally from the great church, but afterwards joined to it by a Galilee porch or vestibule.

This chapel of St. Mary was dedicated on St. Barnabas' Day 1186-7, and is the most complete portion of the abbey which has been left to us. It is a rectangular building 54 ft. long and 24 ft. broad, divided into four bays, with a large angle-turret (the two at the west end containing staircases) at each corner, 6 ft. square, and projecting like the buttresses about 2 ft. beyond the face of the main wall. The design of the chapel is divided horizontally into two, the lower part having an interlaced wall arching both within and without, and the upper part semicircular-headed windows, one in each bay, and a triplet at the west end. Throughout the chapel, on the arching, vaulting ribs, and window arches, is a large amount of the "zigzag," or chevron ornament in various forms, of which some are here given (see block). In addition to this the wall arcade inside was ornamented with fresco, and at the west end traces of canopies, which probably had figures beneath them, are still to be seen, chiefly in red colour. In the second bay from the west, both on the north and south sides, were doorways of four orders, with semi-circular arches richly ornamented with figure sculpture and conventional foliage. That on the north, with a series of subjects, some from the life of the Virgin, in medallions, is by far the most beautiful. It will be found well illustrated in the "Vetus Monumenta" (published by the Society of Antiquaries). A corbel table of two half rounds still remains *in situ* at the top of the chapel walls. Its original finish, probably a parapet, is conjectural. The chapel was vaulted throughout in stone. On a stone in the third bay on the south side are the words *IESVS, MARIA* incised in Lombardic letters about four inches high. Below the level

\* The series of the "Abbeys of Great Britain," issued this month with illustrations of (No. II.), "Glastonbury," (No. I.) "Westminster" was given in our New Year's number, January 6, 1894. Particulars of this and of the three Cathedral series ("England and Wales," "Scotland," and "Ireland") will be found on p. 1 of wrapper.

† Willis's "History of Glastonbury Abbey."



of the ground, outside the wall of the chapel, was a well, covered by a semi-circular arch, enriched with chevron ornament. This is reputed to be the Holy Well, and was apparently approached originally from the outside. At a much later period, however (in the fifteenth century), a crypt was formed below the chapel, and sundry other structural alterations were made—a doorway and an approach to the crypt through the north wall of the chapel, with westernmost bay (see plan, and sketch of doorway on plan); the crypt was lighted by windows, mostly of three lights, square-headed, piercing the original plinth, and a second doorway was made on the south side of the chapel, in the easternmost bay, and a steep flight of steps of somewhat peculiar construction which led downwards to the well. The mark of the low roof which covered this building still shows against the outer wall of the chapel, but there are no traces of where the side walls abutted. The well was also approached from a doorway in the side wall of the crypt. This somewhat peculiar arrangement is shown in detail on the large ground plan. The crypt itself was filled with rubbish until cleared out in 1825, when the passage and stair and well were discovered, and the whole thrown open. This chapel of St. Mary was, as has been mentioned above, originally a building standing distinct from the great Benedictine church eastward of it, the foundations of which, 400 ft. long, "were laid by the king's camerarius, Radulphus, son of King Stephen."\* This work was undertaken either at the same period, or soon after the completion of the chapel of St. Mary. It is quite possible that as the rebuilding of the monastic offices formed necessarily a part of the scheme of rebuilding, that a portion of the nave—that against which the cloister abutted on the south side—was as early in date as the chapel itself. This would account for the distinctly early character of the three remaining bays of the south nave aisle wall—all that is left of this portion of the church. They are distinctly earlier than the work in the remains of the transepts and eastern arm, and have in each bay windows with semi-circular arches inside but pointed outside. Eastward of this, no round arches, either in the windows or arcades, occur. A stone seat runs along the inner face of the wall, and the vaulting shafts, in clusters of three, are brought down on to it. At the west end of the present remains of this wall is the eastern jamb of the west entrance to the cloister—the so-called "Monks' doorway, as distinct from the Abbots' doorway further eastward—which is of

two orders, and formerly had a semi-circular arch enriched with chevron moulding. A portion of the arch remains in good preservation (see block.) Against the south or outer face of the wall are the corbels, and holes which formerly carried the timbers of the roof of the north cloister walk. Flying buttresses were carried over this from the wall of the aisle, and parts of them remain. It should be noted that the corbel table which remains is of the same pattern as that on the Chapel of St. Mary, which seems to show that the wall was carried up to the top, and possibly roofed in at the same period as that of the Chapel.

From measurements which have been taken expressly for the ground plan given in the present number, the division of the nave seems to have been into *nine* bays and not ten, as in the late Professor Willis's plan. It is a matter of some wonder that so interesting a ruin as Glastonbury does not seem to have been planned in detail before—the largest so far published being that in the "Vetusta Monumenta," which has but little detail. The width of the nave seems to have been about 76 ft., or slightly wider than the presbytery, but it is a matter of some difficulty to determine exactly. The only other portion of the nave is the central portion of the west wall pierced by the great western doorway, and arcaded on its inner or eastern face. This is of

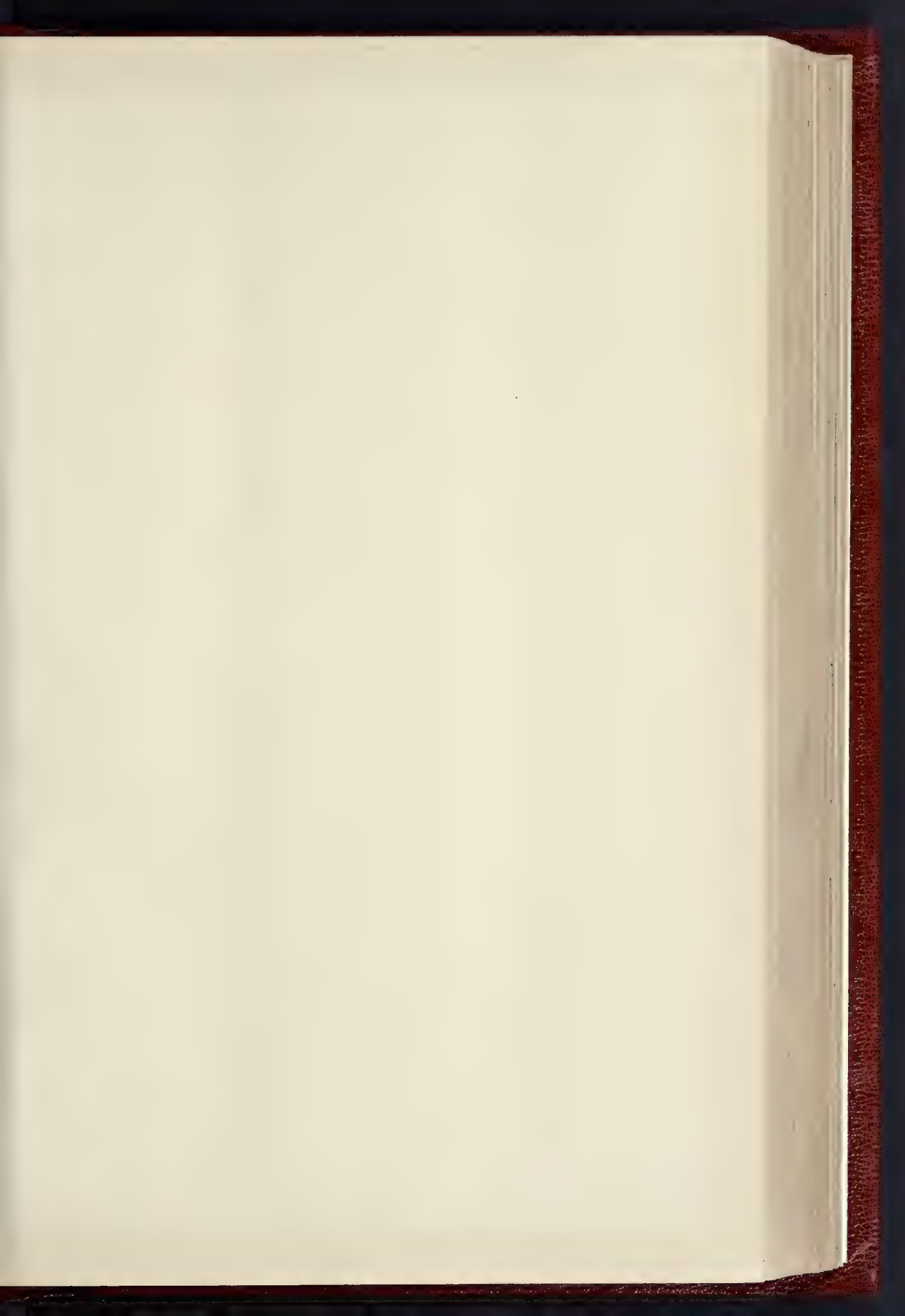
thirteenth-century, or Early English, date, and seems from its style to have been built or rebuilt at the same time as the vestibule or Galilee porch. A point not, we believe, hitherto noticed is that the main axis of the Chapel of St. Mary, and the Galilee is not parallel with the main axis of the great church. The whole of the work westward of the western doorway of the great church bends southward, and the centre line of the great church, if prolonged, would strike the west wall of St. Mary's Chapel, nearly three feet north of the centre. The great doorway is not also central with the vestibule, and there is consequently more wall space on the south than on the north. This has been utilised as a place for, in all probability, a figure or altar, and the bracket for the former still remains in the wall (see sketch of west doorway).

The Galilee itself was of three bays, and arcaded on its inner face. The centre bay in each side was occupied by a doorway. That on the north remains (see sketch), but with the exception of a small portion of the jamb, the corresponding doorway on the south has disappeared. The easternmost bay, next the great doorway, was almost entirely occupied by a flight of steps which led up to the nave level, four or five feet above the level of the Galilee floor. The traces of these steps are still apparent against the bench of the



\* Willis.







SCHOOLS, PORT SUNLIGHT, CHES

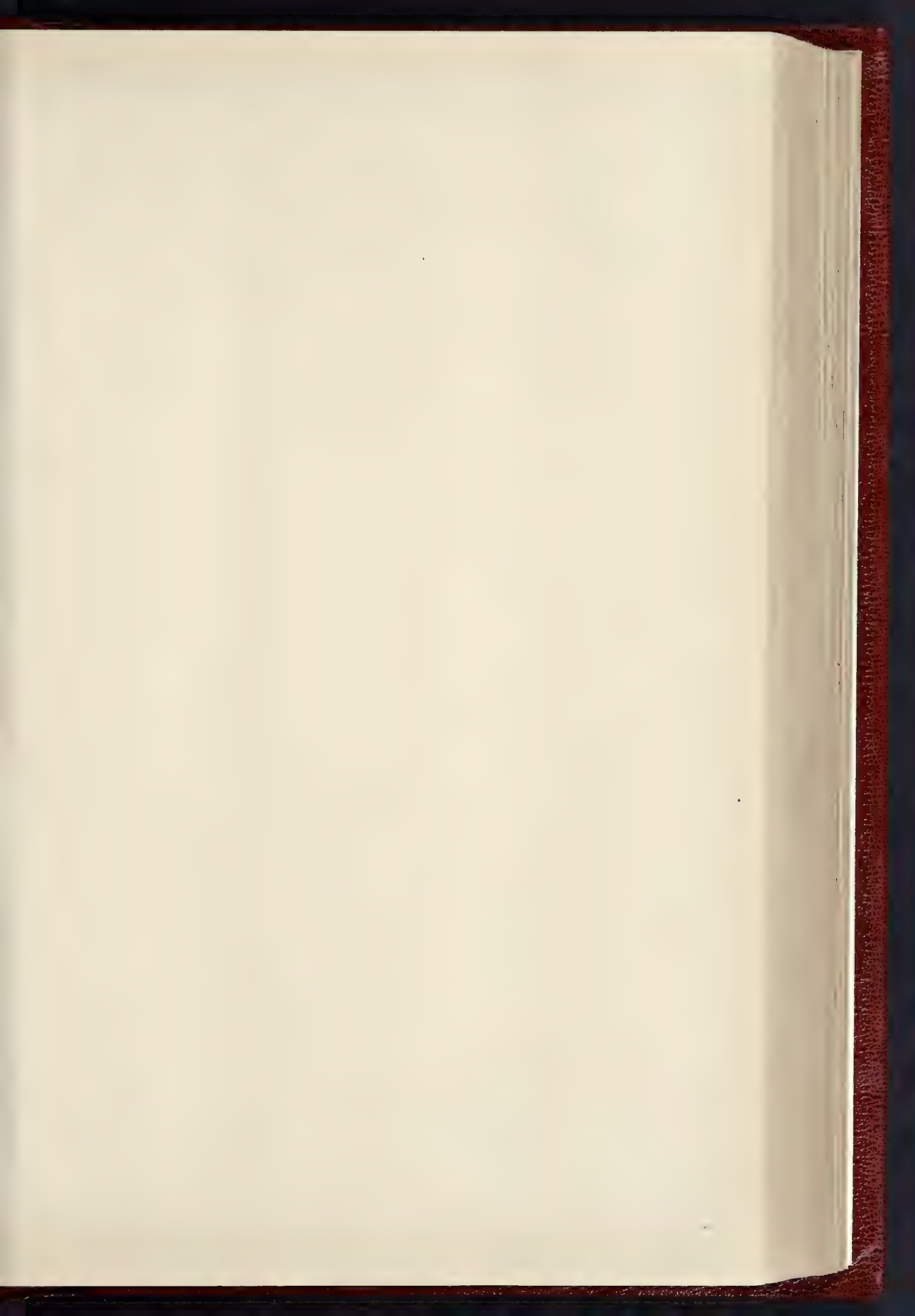
ROYAL ARTISTS' EXHIBITION 1894



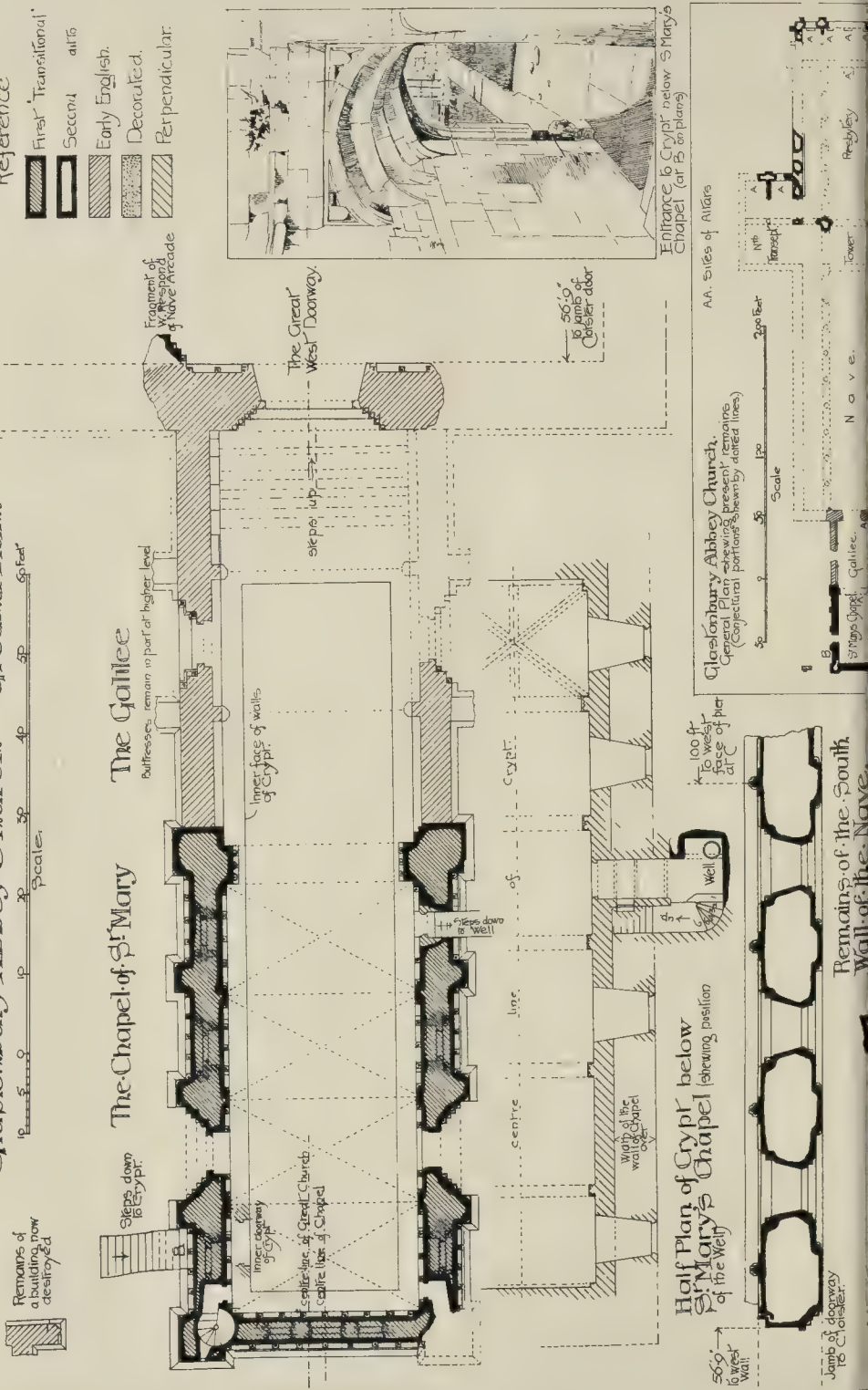








Glaslónbury Abbey Church. — Ground Plan.





Site of the North transept.

Remains of the Presbytery, Central Tower & Transepts.

Side of the Choir.

Chapel.

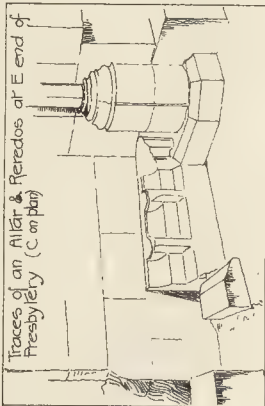
Piscina

Piscina

Traces of an Altar.

Site of the Central Tower.

Choir & Presbytery.



Traces of an Altar & Reredos at E end of Presbytery (Compare)

Site of the High Altar.



Traces of an Altar & Reredos.

Traces of an Altar.

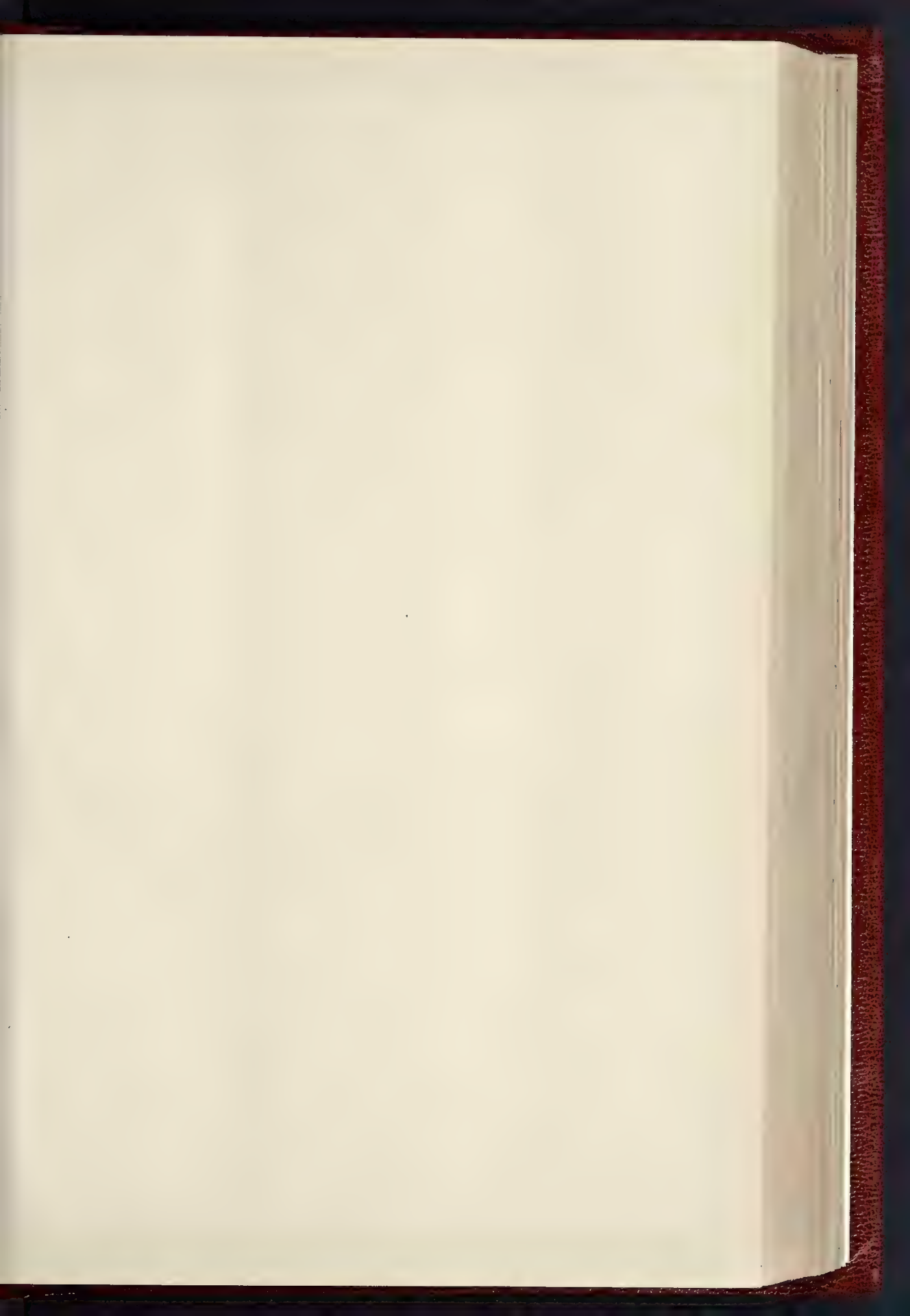
100 ft. to first vaulting space of nave aisle.

Chapel.

Rebuilt to Hall November 1894.







THE BUILDER, AUGUST 4, 1894.





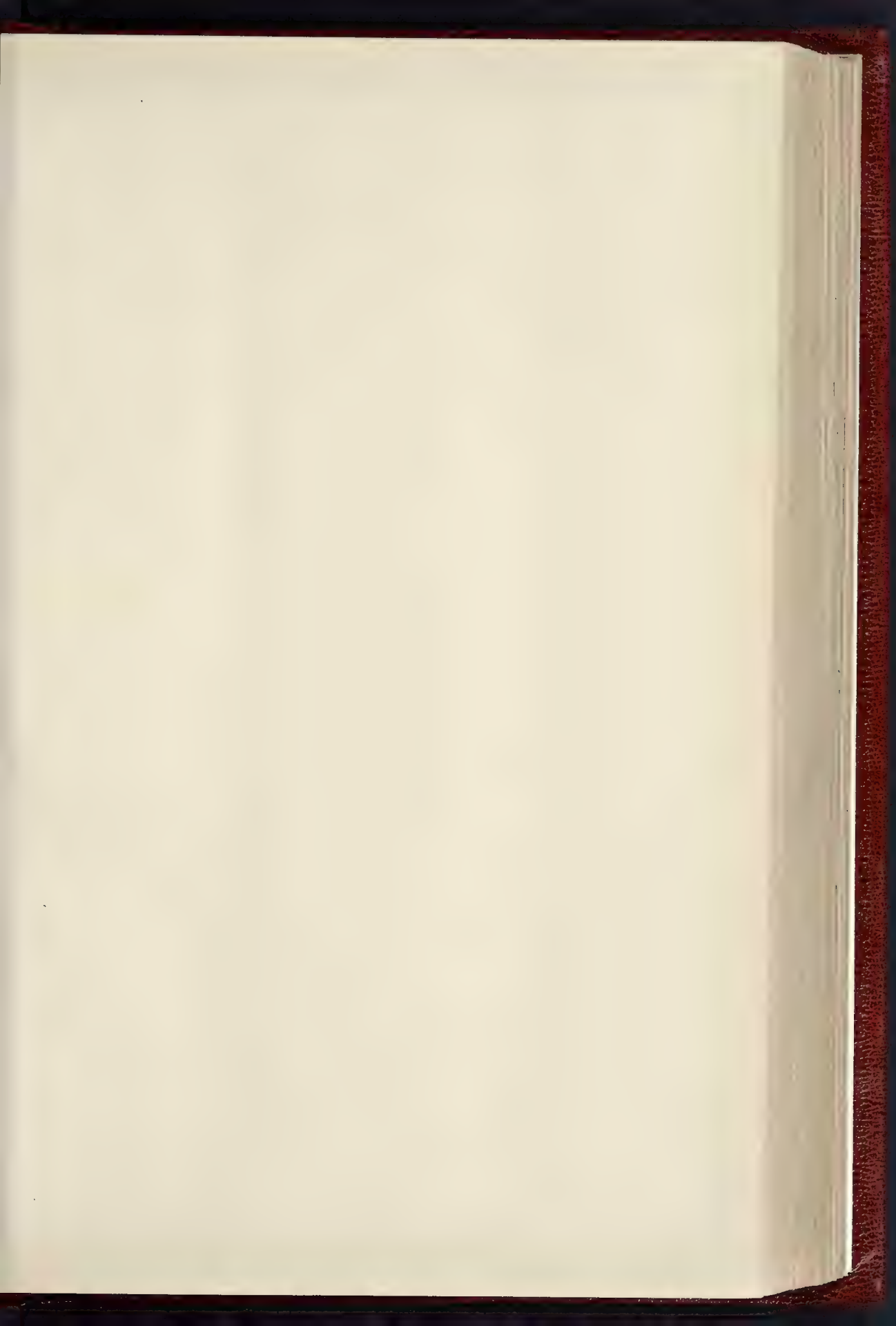


THE ABBEYS OF GREAT BRITAIN.—No. 2. RIEVAULX.

DRAWN BY MR J A SLATER









THE ABBEYS OF GREAT B

DRAWN BY MA



No. 3. GLASTONBURY.  
PAUL

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north wall, and have been shown in dotted lines on the ground-plan. In each bay of the vestibule was a window, of probably three lights, under an enclosing arch but the general design above the arcading has been much ruined, although on the north the wall stands to the corbel table level. The corbel table of the vestibule was composed of a series of small trefoiled arches. These are still visible on the south side. At the period of the building of the Galilee, the eastern wall of St. Mary's Chapel seems to have been removed. The altar of course remained, with its reredos and screen wall behind, and possibly a doorway on either side leading to a vestry which might have occupied the westernmost bay of the vestibule.

The great west doorway itself was a fine arch, 11 ft. wide, of four orders of mouldings, resting on carved caps with conventional Early English foliage. The inner arch was a segmental one, and the space between was partly occupied by cusping. There is no trace of figure sculpture, however. This doorway and the easternmost bay of the Galilee, with its arcading, and remains of the steps leading to the church, are clearly shown in the sketch (see block at the head of preceding page).

We pass now to the central tower and the eastern arm of the church. Of this part of the fabric the two eastern piers of the central tower remain to a slightly higher level than the springing of the great arches; of the transept on the north one of the two chapels remains complete (except for its vaulting), and the second only in part; of the corresponding south transept only a very small portion of the eastern chapel remains attached to the Presbytery wall. The Presbytery outer wall on the south remains in fair condition, very nearly to the east end. The north wall remains, however, only for two bays each of the crossing, in anything like a perfect condition, although the wall remains in a ruined state further eastward. Of the east end two fragments remain,



with traces of three of the five altars, which stood at the extreme east end behind the high altar, and a portion of the return north wall with an ambrey or piscina.

The Choir and Presbytery (in the absence of any traces of the extent of the ritual choir, we take them together) extended for six bays east of the crossing.\* At the end of the sixth bay is a large double buttress on the south, with which corresponded a similar one on the north, and these mark the position of the east wall of the presbytery, in front of which stood the reredos and high altar. Beyond this was an extension of two bays, which were returned und the east end, the first being used



as an ambulatory, and the second for a row of five altars. This arrangement, although the order of monks was different, may be compared with the present existing presbytery at Abbey Dore (Cistercian), in Herefordshire, a detailed plan of which was given in the *Builder*, April 8, 1893. There the arrangement is complete, although the altars themselves have gone. At Glastonbury, on the contrary, only two of the partition walls remain in ruins, but against the portion of the east walls adjoining are interesting traces of three of the altars which stood here, and one of them (that to the south of the centre) shows also the base of the panelling of its reredos. (See sketch on large ground-plan.) The two fragments of division walls, and the two eastern vaulting-shafts against the south wall are Late Decorated in date, and form probably a portion of the work of completion carried out by Abbot Monington, 1342-1376. The foundations, it must be remembered, had been laid in the twelfth century of the whole of the church, and the *plinth of the eastern end of the presbytery chapels has the same section as that round the Chapel of St. Mary*. The whole of the work of the Presbytery has evidently been carefully copied from the slightly earlier work of the nave, with a slight alteration in detail, as for instance in the use of the pointed arch throughout, instead of the semi-circular. Coming westward to the Transepts and Central Tower we find an interesting and curious arrangement in the former. They had apparently no western aisle, but there was not only an eastern aisle but the Transept chapels were thrown out east again, which gives the Transept a double aisle on this side. Doubtless this aisle was useful either for processions, or if closed was probably largely utilised for tombs of abbots and benefactors, but its planning is believed to be unique. Of the piscine in these chapels one remains perfect and is here given (see block). From the fragments of the wall attached to the eastern tower piers we are enabled to determine the design of the Transepts. The triforium was a lofty one, and had an arcade of three trefoiled-headed

arches under a pointed inclosing arch, enriched with chevron ornament. The clearstory appeared inside as a triplet, but the two side openings were filled in at the back, so that a single lancet only appeared on the exterior. We do not know, of course, what the design of the ends of the transept was, but judging from the size of the windows remaining, the effect of the interior must have been solemn in the extreme. A very small portion of panelled wall projects from the east side of the tower piers at some height from the ground, and appears to be the remains of an alteration in the design of the upper portion of the Choir in Late Decorated or Early Perpendicular times. Abbot Monington, who completed the chapels east of the Presbytery "made," according to Leland, "the vault of the choir and presbytery," and it may possibly be of his date, but we should be more inclined to attribute it to Abbot Beere (elected 1493), who inserted a "St. Andrew's Cross" under the tower arches (like those at Wells Cathedral) to save the central tower, and very probably the later panelling we see now is part of the general strengthening of the wall adjacent to the tower piers which would be rendered necessary. The mark of the "St. Andrew's Cross" is still very clear on the west side of the piers, and shows on the large view.

Of the numberless monuments and shrines which this abbey contained, and which included the tombs of King Arthur and his Queen, King Edmund, and Edmund Ironside, hardly a vestige remains. A fragment of a thirteenth-century effigy lies, with other fragments, in the north transept; and an early effigy of an abbot with crozier and mitre stands against the east wall of the abbot's kitchen. There is also a late tomb in St. John's Church, hard by, said to have been brought from the Abbey church, and to represent one "Camel" or Campbell, a purse-bearer. The panels on the sides of the tomb are alternately occupied by Camels, and angels holding shields charged with the Abbey arms. On the top is a fine effigy with a somewhat elaborate purse hanging from a girdle at the side.

\* The roodbeam was across the Eastern tower arch, so that the ritual choir was east of this.

Of the great group of monastic buildings, only the abbots' kitchen and the barn remain if we are to except the old hostelry (now the "George Inn") and the "Tribunal" in the High-street, which were both outside the monastic precincts. The Abbots' kitchen, however, is a well-known building 33 ft. 10 in. square on plan, with a fire-place in each corner, the whole being of stone, including the vaulted roof and lantern. A few feet north of it, and once connected with it by other buildings is a fragment of a large doorway, by the side of which is a staircase which led to an apartment over. It undoubtedly formed part of the Abbots' lodgings, and it must be remembered that the kitchen itself was the Abbot's private kitchen, and not that belonging to the Abbey generally,



Piscina  
in chapel of the  
North Transept.

which will give some idea of the scale on which the establishment was planned. The kitchen, and the building north are of fourteenth-century date. The only other remains are the fine tithe-barn, standing some little distance south, cruciform, with the emblems of the Evangelists in panels in the gables, and measuring, according to Pugin's plan, 85 ft. 8 in. in length inside, and

25 ft. 9 in. in breadth, while the porches on either side projected another 20 ft.\*

A small portion of one of the entrances to the abbey (on the west) is now incorporated with the "Red Lion Inn," and at one or two points the ancient enclosing wall of the monastic precincts remains.

For nearly the whole of the abbey buildings, with the exception of some of the internal work, Douling stone (from the quarries near Shepton Mallet), has been used, and the beauty of the masonry and jointing is exceptional. Purbeck marble was largely used for the detached columns of the arched and window and door-jambes in St. Mary's Chapel, and also in the columns of the Transept clearstory. With the exception of one column, still *in situ* in the remaining portion of the clearstory of the south Transept, all the Purbeck shafts have disappeared. Those of the arched of St. Mary's Chapel were banded midway between cap and base.

#### SCHOOLS, PORT SUNLIGHT.

THESE schools are being built in a central position in the picturesque village which Messrs. Lever Brothers are building for the use of those engaged in connexion with their extensive works. The bridge in the foreground spans a ravine, which, by retaining its natural slopes and fine trees, assists in realising the *ensemble* of an old English village.

The school is intended for boys and girls, and with the infants' department will accommodate 500 children.

A separate room is provided for each class in the mixed school, so that the teaching may be as efficient as possible, while four of these rooms can be readily thrown open to the main hall by sliding back the glazed screens; facilities for teaching science, cookery, and woodwork are provided, also spacious playgrounds, and it is proposed to erect a gymnasium and swimming-bath.

The large hall (including four class-rooms) will be used for services on Sundays and other occasions, a chancel with vestry being attached, which will be screened off when not in use.

The schools are of Ruabon brick and Helsby stone with green slated roofs, and the work is being carefully carried out (without a contractor) by Messrs. Levers' own workmen, under the superintendence of Mr. R. Nickson.

Messrs. Douglas & Fordham are the architects of the schools and the bridge, as well as of various houses in the village.

The drawing is exhibited at the Royal Academy.

THE PARK ROADWAYS.—The roads in the parks under the jurisdiction of the Office of Works are to be treated this year with Rutty's patent "scarifier," which will be at work continuously for the next six or seven weeks, over about 130,000 superficial yards of roads, commencing with Hyde Park.

\* See Pugin's "Examples of Gothic Architecture," vol. ii.

#### THE LONDON COUNTY COUNCIL.

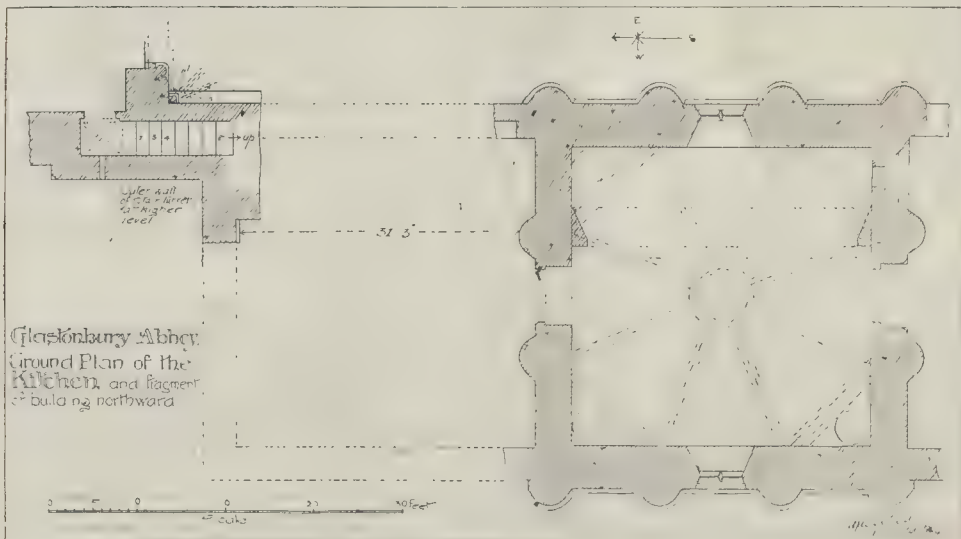
THE usual weekly meeting of the London County Council, the last before the summer recess, was held on Tuesday, in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

**Working Class Dwellings.**—The Public Health and Housing Committee reporting on the erection of buildings on the Goldsmith-square site, Shoreditch, for the accommodation of persons displaced by the Boundary-street scheme, said they were of opinion that the erection of the buildings should be put in hand at once, and not delayed beyond the recess. They had carefully examined the plans, with the view of ascertaining whether their cost could be reduced, but they were satisfied that no further economy was desirable. Moreover, they were informed by the architect that unless the work was at once proceeded with the cost would be increased, as it would have to be done in the winter months. The estimated cost of the dwellings was 5,953*l.*, and accommodation would be provided for 144 persons. They submitted the plans, specification, and estimate, and recommended:—"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the dwellings to be provided on the Goldsmith-square site be erected by the Council without the intervention of a contractor, and that the plans, estimate, and specification be referred to the Works Committee for that purpose." This was agreed to.

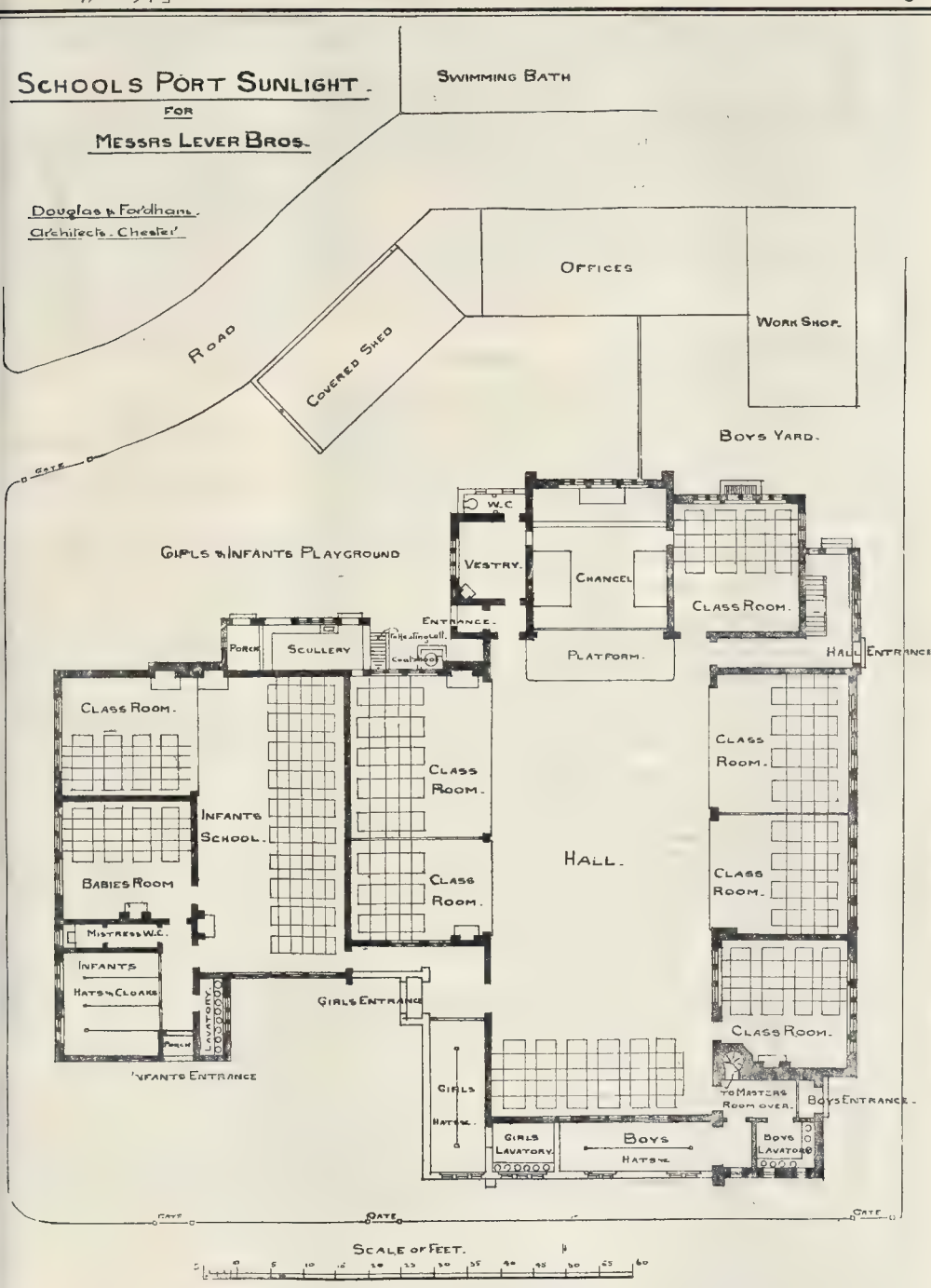
**The Shaftesbury Memorial Fountain.**—On the reception of the report of the Improvements Committee, Mr. Arter, the chairman, in reply to Mr. Moss, said that the total cost to the ratepayers of the works in connexion with the Shaftesbury Memorial Fountain was 1,558*l.* The estimated annual cost of working the fountain was 234*l.*

**The Strand Widening.**—The same Committee submitted the following recommendation in connexion with the proposed widening of the Strand at its junction with Wellington-street:—"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the Statute, the Council do accept the offer of the New Telephone Company to sell to the Council for 20,000*l.* their interest in the land on the eastern side of Wellington-street, at its junction with the Strand, and shown upon the plan submitted to the Council by the Improvements Committee, and do take the necessary steps for carrying out the improvement as shown upon the plan; and that the solicitor be instructed to complete the above arrangement with the company."

Mr. Westacott proposed that the recommendation be referred back to the committee for further consideration. He said that if they adopted the report, besides paying 20,000*l.* for the land, they would also have to pay a yearly ground rent of 1,700*l.* A more outrageous and absurd proposal







had never been submitted to the Council, and he hoped they would never hear any more of the matter.

Mr. Hubbard seconded the amendment, which was agreed to.

**Electric Lighting of the Embankment.**—The Highways Committee presented a report on the proposed electric-light installation for the Victoria Embankment and Waterloo and Westminster Bridges, which would involve a capital expenditure of 20,000*l.*, but on the motion of Mr. Westacott, the consideration of the matter was adjourned until next spring.

**The London Streets and Buildings Bill.**—The Parliamentary Committee reported as follows in reference to the London Streets and Buildings Bill:—

"After consideration by a Hybrid Committee for twenty-two days, this Bill has passed the House of Commons. It must be borne in mind that the Bill is both a consolidating and an amending measure, and accordingly its progress through Parliament may advantageously be considered from both points of view. A consolidating Bill is exposed to the especial danger, when accompanied by amendment, that in seeking new powers existing powers may be lost. So far this danger has been avoided.

A right of appeal not previously existent has been in many places allowed, but with this exception, no existing power of the Council has been taken away, since minor restrictions, which have been intentionally removed as useless, or even harmful, cannot be looked upon in the light of losses. If this be so, the Council may be well congratulated on having so far accomplished the consolidation of the law regulating buildings and streets in London. A consolidation which involves the complete repeal of 8, and the partial repeal of 7 Acts of Parliament is a work of no small importance. That the Bill in its present shape, with its 214 clauses and 4 schedules, is a vast improvement upon the present incongruous mass of statutes is, we venture to say,

not denied by anyone familiar with its provisions. Looked at as an amending measure the Bill as it went to the Upper House is in many most important particulars a far stronger code than the existing legislation, though it must be admitted that in some parts it has been seriously altered in its passage through committee. The great length of the Bill was, perhaps, its most serious enemy. Many points had to be yielded which in all probability might have been carried through had time permitted their support by evidence. At the same time it would be wrong to suppose that the opposition to which it has been subjected has in all cases damaged the Bill. Far from it. The opposition of the Royal Institute of British Architects, of the Surveyors' Institution, and of the Ecclesiastical Commissioners, has, upon the whole, resulted in making it a better measure, certainly a more workable one. [The numbers of parts and clauses alluded to in this report are those of the Bill as reprinted after passing the House of Commons.]

Part I. *Introductory*.—The definitions have been simplified and improved.

Part II. *Formation and Widening of Streets*.—This gives the Council the important power to insist in certain cases upon a greater width than 40 ft. for new streets (up to 60 ft.), but in the case of streets formed upon land previously occupied by buildings, compensation is to be given under the Lands Clauses Acts. The original Bill contained a provision to prevent the raising or rebuilding of existing buildings within 20 ft. of the centre of the roadway to a greater height than at present, but the committee struck this out. A very important power, however, is given, viz., to prevent the rebuilding of dwellings of the working classes within "the prescribed distance" of the centre of the roadway, which will do a great deal towards preventing the creation of slums.

Part III. *Lines of Building Frontage*.—This is practically the re-enactment of the existing law, with some useful amendments.

Part IV. *Naming and Numbering of Streets*.—Calls for no comment.

Part V. *Open Spaces about Buildings and the Height of Buildings*.—This is the part of the Bill which provoked most opposition and which has been most altered. It is the part which from the first has been most productive of difficulty, and the difficulties, real no less than imaginary, increased with discussion. To frame clauses that should prevent conditions which all desire to prevent, yet which should not interfere where interference was not called for, is an almost insuperable task. Justice no less than expediency demanded considerable concessions from the clauses as they stood in the deposited Bill. It was originally proposed that every new building should have a space at rear 10 ft. in depth and extending throughout the width of the building, and, moreover, that the height of the building should be kept within a plane inclined at an angle of 45 deg. towards the building from the rear boundary of such open space; also that buildings erected upon old sites should be allowed to deviate from these rules as much as the previously existing buildings, but not more. This rule was amended so as to apply to domestic buildings only, and the angle was altered to 63½ deg.; moreover, buildings upon old sites, while limited as to area by the previously existing building, are not limited as to height as they were in the original Bill. But while this is true of domestic buildings in general, very important powers of control have been given over dwellings for persons of the working classes, which would make such gross cases of overcrowding on space as are now common almost impossible in the future. The attempt to make general the existing rule which limits the height of buildings in streets laid out since 1862 of less than 50 ft. in width to the width of the street has failed, and as regards the height of buildings generally the old law has been re-enacted with one important exception; the present maximum height is 90 ft., the Council asked for the limit to be reduced to 75 ft., and the Committee have fixed it at 80 ft. The clause which directed that all domestic buildings within 20 ft. of the centre of the roadway should, on re-building, be set back, was not pressed; it could not have been carried unless coupled with compensation, so it was thought best to drop it. Speaking generally, Part V. of the Bill, though disappointing in some respects, cannot be regarded otherwise than as a great strengthening of the existing law.

Part VI. *Construction of Buildings*.—A complicated and difficult provision intended to provide that every window of a habitable room should command an angle of light of forty-five deg. was withdrawn at an early stage; also the attempt to regulate buildings under railway arches had to be abandoned. The whole part is very technical in character; several irksome and unnecessary restrictions have been removed, while several important new powers have been given.

Parts VII.-XIII. are so nearly re-enactments as to call for no special comment. A method of arbitration has been inserted in reference to dangerous structures, but so as not to prevent the Council from taking immediate action where necessary.

Part XIV. *By-laws*.—The number of matters with respect to which the Council may frame by-laws is greatly increased.

Part XV. *Legal Proceedings*.—The proposal to

assign the duties arising under the Act exclusively to a special magistrate was withdrawn at the instigation of the Home Office.

The Tribunal of Appeal, which it was proposed should consist of five members appointed respectively by a Secretary of State, the Royal Institute of British Architects, the Institution of Civil Engineers, the Surveyors' Institution, and the Council has been reduced to three members appointed respectively by a Secretary of State, the Royal Institute of British Architects, and the Surveyors' Institution.

A power to administer an oath has been given to the tribunal, and its powers generally have been more clearly defined.

Part XVI. *Miscellaneous*.—In respect to exemption, the City has been placed in as near as possible the same position as it was. The dock companies are exempted. The railway companies are exempted, subject to a proviso as regards buildings used for the purpose of human habitation.

After transacting other business the Council adjourned soon after eight o'clock until Oct. 2.

## COMPETITIONS.

SCHOOLS, HIGHTOWN, SALFORD.—The Salford School Board have recently invited competitive designs from five firms of architects practising in Manchester and Salford for the erection of new schools, Marlborough-road, Hightown, have chosen for execution the scheme submitted by Messrs. Woodhouse & Willoughby, of Manchester. Provision is made for 870 scholars, 450 infants on the ground floor, and 420 girls on the first floor. A gymnasium and cookery class-room are also provided. The school is on the central hall principle. The front elevation is intended to be faced with Ruabon stocks and terra-cotta. A mechanical system of heating and ventilating is contemplated, operating from the basement by means of fans. The estimated cost is about 9,000l.

LLANDUDNO MUNICIPAL BUILDINGS.—The Llandudno Improvement Commissioners have appointed Mr. T. M. Lockwood, F.R.I.B.A., of Chester, as assessor in this competition.

CORPORATION-ROAD SCHOOLS, DARLINGTON.—A special meeting of the Darlington School Board was held at the School Board offices on Tuesday afternoon, to receive and consider the report of Mr. E. R. Robson, architect, London, on the competitive plans for the new schools in Corporation-road. Mr. Robson placed the designs in the following order of merit:—1st, "Q.E.D.," by Messrs. Clark & Moscrop, Darlington; 2nd, "1894," by Messrs. Clark & Moscrop, Darlington; 3rd, "Up-to-Date," by Mr. G. G. Hoskins; 4th, "Progress," by Mr. Frank Martin; 5th, "Lux," by Messrs. J. P. & H. D. Pritchett. Mr. J. T. Hall occupied the chair. The chairman said Mr. Robson had gone very carefully into the designs. They proposed, therefore, to employ the author of "Q.E.D." as the architect for the new schools. The motion was then put to the meeting, and carried unanimously.

NORTH RIDING (YORKS) COUNTY COUNCIL OFFICES.—The five architects invited to compete for the above, viz., Messrs. Demaine & Brierley, York; Messrs. Clark & Moscrop, Darlington; Messrs. Broderick & Smith, Hull; Mr. C. H. Fowler, F.S.A., Durham; and Mr. C. J. Ferguson, F.S.A., London, have sent in their designs. At a committee meeting of the Council it was decided to ask Mr. A. Waterhouse to assist in the selection. Each of the invited architects receives a premium of 25l.

WINWICK ASYLUM.—Messrs. Crisp & Oatley, of Bristol, whose names were given in our last issue as the selected architects for this asylum, write to say that Mr. W. S. Skinner, also of Bristol, is joint architect with them, and his name should have been coupled with theirs.

## Correspondence.

To the Editor of THE BUILDER.

### INFORMAL TENDERS.

SIR,—A few weeks ago the Lambeth Guardians advertised for a smoke-shaft, &c., to be erected at their workhouse at Kennington. The tenders were to be on their printed form and the terms of the advertisement were to be complied with. We and two other builders complied with these terms in every respect, and our tender was lowest. A fourth builder sent in his bill of quantities, unsigned, and without the form of tender. A few of the guardians very properly considered this was informal and should be ignored. However, the builders' representative fetched in his employer, and the board allowed him to procure a form of tender which he filled up at a public-house opposite, and they accepted him. Is this fair treatment to the other builders? True, he was lowest, but public bodies as a rule refuse to accept informal tenders, and we must raise our protest against the Lambeth Guardians' decision. J. YATES & CO.

July 31, 1894.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—V.

#### GRAVITATION.

IT has already been stated that a gravitation supply should always be adopted where possible, especially for rural districts.

The principal requirements of a gravitation scheme are as follows:—

1.—That the spring or source of supply is situated at a sufficient elevation with regard to the place to be supplied so as to produce a velocity in the pipes sufficient to deliver the quantity of water required.

2.—That the intervening ground along the proposed line of the pipes, between the source of supply and the district to be supplied, does not rise appreciably above the hydraulic mean gradient of the system.

3.—That the pipes are selected of such dimensions as will discharge the requisite quantity without necessitating a greater velocity than 3 ft. per second.

4.—That sufficient storage room is afforded, so as to allow for exceptional demands upon the supply, as well as for diminution in the latter in very dry seasons.

The subject of the flow of water in pipes has been so elaborately dealt with in the various textbooks that only the leading principles affecting actual practice will be dealt with here.

In the annexed figure (1), a pipe is shown connecting two reservoirs A and B, in each of which the water is always kept at the same level. Vertical pipes C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>, open at the upper end, are attached at intervals to the pipe A-B. If the extreme end B of the pipe A-B be closed, the water will stand in the pipes C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub> at the level of the horizontal line A-D, through the surface of the water in the reservoir A.

As soon, however, as the end of the pipe at B is opened, and the water is allowed to flow uninterruptedly from the reservoir A to the reservoir B, the level of the water in the pipes C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub> will sink to E<sub>1</sub>, E<sub>2</sub>, E<sub>3</sub>, respectively. The line connecting the points E<sub>1</sub>, E<sub>2</sub>, E<sub>3</sub> is called the hydraulic mean gradient, or virtual slope of the system, and if the pipe A-B be of uniform section throughout its length, the hydraulic mean gradient will be a straight line joining the surface of the water in A and B.

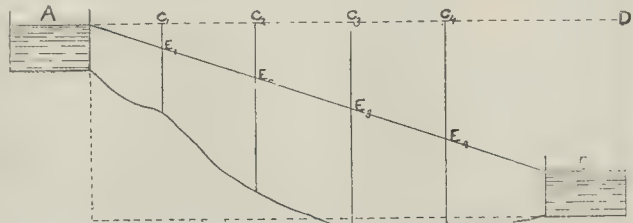


FIG 1



This gradient is represented by the height of the reservoir A above the reservoir B divided by the length of the pipe, which is the sine of the angle made by the line of the gradient with the horizontal. It has been found that the velocity acquired by water flowing through a pipe varies directly as the square root of the quantity representing the hydraulic mean gradient and directly as the square root of the diameter of the pipe.

The section of the pipes C, C<sub>1</sub>, C<sub>2</sub>, situated between the line of pipe A B and the hydraulic mean gradient denotes the pressure (in addition

These formulae allow a sufficient margin for subsequent rusting in the pipes.

By substituting the value 3 for  $v$  in the first equation, the following result is obtained—

$$d = .006 \times \frac{1}{v}$$

which enables the diameter of a pipe to be calculated where the head and length are known, so that the velocity may be 3 ft. per second.

A gravitation supply usually requires a larger storage capacity than a pumping supply, as the sources are generally small at such elevations as

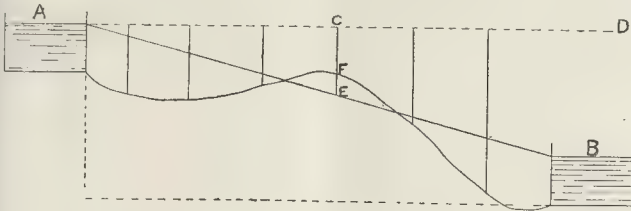


FIG 2

the atmospheric pressure) in the pipe at those points, and it is evident that when the line of pipe and the hydraulic mean gradient coincide, the pipe may be replaced by an open channel.

Suppose, however, that the line of pipe rises above the hydraulic mean gradient, it is clear that the pressure at that point is less than the atmospheric pressure by an amount indicated by the distance of the pipe above the hydraulic mean gradient. When this distance exceeds the height of a column of water which can be supported by the atmospheric pressure (34 ft.) the pressure becomes nil and flow ceases. Practically, the distance should never exceed 25 ft. When the pressure at any point F (fig. 2) is less than the atmospheric pressure, the flow continues by syphonage until sufficient air is extracted from the water, which fills the summit of the pipe, and syphonage ceases. The pipe at this point may then be replaced by an open channel. The pipe is practically divided into two sections, A F, F B and the discharge at B must depend upon the quantity which the first section A F is capable of delivering at the point F.

As the velocity, and, therefore, the discharge, depend upon the diameter of the pipe and upon the hydraulic mean gradient, a deficiency in the latter may be made up by an increase in the former. In the case just cited, the diameter of the pipe between A and F should be increased, so that, with the gradient A F, the same volume of water may be delivered at the point F as the portion of the pipe between F and B is capable of discharging with the gradient F B.

When the end of the pipe B (Fig. 1) was closed, the level of the water in the pipes C, C<sub>1</sub>, C<sub>2</sub> rose to the same horizontal level as the water in the reservoir A. The hydraulic mean gradient will, therefore, rise or fall between the lines A D A B, according as the orifice at B is closed or open.

In practice the orifice at B is never constantly open to its full extent, or, in other words, the maximum quantity that the main is capable of discharging is not constantly being discharged. Advantage is taken of this fact in the use of air-valves, which are fixed at the summit of all sections of the main which rise above the hydraulic mean gradient (calculated upon a maximum discharge). Whenever the consumption is less than the maximum, the hydraulic mean gradient rises, forcing the air out of the summits of the system and allowing syphonage to recommence, when the hydraulic mean gradient falls back to its lower position.

The formulae generally used for calculation of velocity and discharge of water in pipes are:—

$$1.-v = 39 \sqrt{d \cdot i}$$

Where  $v$  = velocity in feet per second.

Where  $d$  = diameter of pipe in feet.

Where  $i$  = height of point of supply above point of discharge ( $\frac{1}{2}$ ) divided by the length of the pipe ( $l$ ) ( $= \frac{h}{l}$ ), each of which must be referred to the same unit—say feet.

$$2.-g = \sqrt{\frac{3d^5 \times h}{l}}$$

Where  $g$  = discharge in gals. per minute.

Where  $d$  = diameter of pipe in inches.

Where  $h$  = head in feet.

Where  $l$  = length of pipe in yards.

will allow of gravitation. The amount of storage is regulated by the volume and permanency of the source. This matter, together with the subject of collection, will be dealt with in a subsequent paper.

When the source of supply is situated below the level of the immediately surrounding ground, and considerable expense would be entailed by excavation to a sufficient depth to allow a fall in the direction of the supply, recourse may be had to a syphon. The summit of the syphon must theoretically not exceed 34 ft. above the level of the surface of the water from which the supply is to be drawn; practically about 25 ft. is the limit.

The syphon may be charged by an air-pump attached to the longer leg, the communication with the main being cut off by means of a sluice-valve; or the extremities of both legs may be closed by means of sluice-valves and the apparatus filled with water through a cock at its summit; the cock is then closed and the sluice-valves opened, when flow immediately commences. When the water is highly aerated the syphon has to be frequently recharged. In calculating discharge the head must be measured to the surface of the water in the reservoir, and not to the summit of the syphon.

#### GENERAL BUILDING NEWS.

**ST. PETER'S CHURCH, STAINES.**—On June 24 of last year we published an illustration of this church, which was consecrated by the Bishop of Marlborough on Saturday last. The church, as our readers may remember, is the gift of Sir Edward Clarke, the former Solicitor-General; and the architect is Mr. H. Fellowes Pryne. In 1892, the tender of Messrs. Goddard & Sons, of Farnham, for 6,000*l.* was accepted, this sum being exclusive of the tower and spire, which have since been given by Sir Edward Clarke, at an additional cost of about 1,400*l.* The screen has also since been given at a cost of nearly 300*l.* The style chosen is a free treatment of Perpendicular Gothic in red brick and stone. The nave is of four bays 26 ft. wide by 80 ft. in length, having a height of 40 ft. to the apex of the wagon roof. The chancel is of the same width and height as the nave. There are north and south aisles to the nave, and a narthex at the west end with western entrance. The tower, which is placed at the south-west end of the south aisle, is designed in three stages and finished with a copper-covered spire. In the lower stage on the nave floor level a baptistry is formed. A southern transept, with separate entrance forms the nave of a small chapel on the south side of the chancel. On the north side of the chancel are clergy and choir vestries with the organ chamber. The altar is elevated by nine steps from the nave floor level, and ample space and height are left above and behind the altar for a baldachin or reredos. One of the main features of the Church is the constructional roof screen, which is carried right up into the chancel arch, the upper portion of which is enriched with tracery. The central figure and roof are designed to be cut out of the solid stonework of the tracery, and the side figures placed on corbels formed in the panels of the tracery. This feature is quite unique, no other example of similar treatment existing. All the sculptured work has been done by Mr. J. Taylerson, of Lavender Hill. Mr. W. H. Augur, of Staines, has acted as clerk of works. The choir stalls have been presented by Sir Edward Clarke, and the altar, which is of very elaborate design, and which is to be highly decorated in gold and colours from the architect's design, is the gift of

Lady Clarke. Both the stalls and altar have been carried out from the architect's designs by Messrs. Lewis & Co., of Camberwell. The iron screen work and chancel gates and door furniture have been made by Messrs. Singer & Sons, of Farnham. The rich dossal and hangings were supplied by Alfred Stalman of Frith-street, Soho. Messrs. John Warner & Sons, of London, supplied the bells. Mr. Puckle, the churchwarden, presented a window in the south aisle, and a pair of old Norwegian candlesticks were given by a legal friend.

**PROPOSED CHURCH, HOWTH, DUBLIN.**—It is proposed to erect a new church at Howth, Dublin, Mr. W. H. Byrne is the architect appointed. The new Church of the Assumption will be in Romanesque style, comprising nave, with circular apse, transepts, side chapels, and two sanctuaries. The total length will be 125 ft., the width of nave 32 ft. The transepts are each 30 ft. by 20 ft. At the west end, which is the principal entrance, there will be moulded doors, with circular windows over the centre. The tower is also at the west end, with spire about 150 ft. high. There are moulded stone arches supported on polished granite columns between nave, transepts, and side chapels. The roof of the apse is to be groined and supported on polished granite shafts. The roofs of nave and transepts will be in timber, divided into panels. The materials used in the building will be the local limestone.

**NEW MISSION HALL, KENSINGTON.**—On the 25th ult. the foundation-stone of St. Mary Abbot's new Mission Hall and Infants' School for the Hon. the Rev. E. Carr Glyn was laid by Mrs. Temple. The new building will include an infant school and class-room on the ground floor, built according to the requirements of the Education Department, the plans having been approved. On the first floor will be the mission hall, to accommodate 200 persons, with cookery class-room adjoining, approached by stone stairs. A caretakers' residence is provided on the second floor. The building will be faced with red brick and Monks Park stone. The floors are to be of Dawney's fireproof construction. The total cost will be 2,500*l.* The builder is Mr. Walter Nash, of Kensington-road, and the architect, Mr. T. Phillips Figgis.

**RESTORATION OF PRESBYTERIAN CHURCH, CARLISLE.**—The memorial stone of what will practically be the new Fisher-street Presbyterian Church, Carlisle, was recently laid by Mrs. Christie. All that remains of the old church are the side walls. According to the plans, which have been prepared by Mr. T. Taylor Scott, the architect, the front of the church will be brought forward to within a short distance of the street line in Fisher-street, thus adding to the length of the old building; the roof will be entirely reconstructed, and at the east end there is to be a chancel for the organ. The external front of the church will be new. In style it is to be Transitional Gothic. The scheme also includes the removal of the present winding stairs leading to the galleries, and these will be replaced by two staircases to be approached from the outside, each by a moulded Gothic doorway. At the same time there will be communication between the large central vestibule and the gallery stairs, which are to be of fireproof material, and the gallery itself will be entirely new. The church will also be newly seated, accommodation being provided for 750 worshippers. Under the chancel recess provision is made for a new heating apparatus. The new ceiling will be divided longitudinally into three sections, the nave roof being semi-polygonal in outline and divided into bays by ornamental principals, whilst the roofs over the two side aisles will also be open-boarded and divided into panels. Messrs. W. & H. Davidson are the contractors.

**SCHOOLS, STOCKPORT.**—The new schools which have been erected in connexion with St. Peter's Church, Stockport, were opened on the 21st ult. by the Bishop of Chester. The plans of the building were prepared by Messrs. Woodhouse & Willoughby, of Stockport, and the contract was placed in the hands of Messrs. T. & W. Meadows. The window-sills and copings of the buildings are of Ruabon terra-cotta brick, while in a terra-cotta niche, just over the main entrance, will stand, covered by a canopy, a statue of St. Peter, modelled in Rushton clay by Mr. George Holden, of Manchester. One side of the large schoolroom may be divided into three class-rooms by means of folding shutters, the patent of Messrs. Peace & Norquoy, of Manchester. Mr. Kelsall has acted as clerk of the works. The school is a mixed one, but there will be separate entrances for girls and boys, and two separate playgrounds paved with asphalt. The boys' entrance will face the post-office, the girls will enter by way of Hooper street. In the basement of the building is a kitchen. There are other rooms, managers' committee-room, store-room, &c. The heating apparatus, on the hot-water system, was supplied by Mr. Isaac Beeley, of Hazel Grove.

**EXTENSION OF BIDDULPH CHURCH, STAFFORDSHIRE.**—Biddulph Church, after having been closed for some months for extension and repair, has been re-opened. The works just completed consist of a new organ-chamber at the east end of the north aisle, with a priest's doorway on the north side of it; the re-seating of the whole of the church with benches of oak, mostly from Bagot's Park; new



flooring throughout the church, with oak-blocks beneath the seats, and Campbell's tiles in the passages; and a new heating apparatus. The old pewing has been appropriated to wainscoting the walls of the organ-chamber and of the church. Messrs. Ward & Son, of Uxottery, were the general contractors for the above works, and Mr. Lynam was the architect.

**ADDITIONS TO CHURCH, LINCOLN.**—The church of St. Peter-in-Eastgate, Lincoln, was re-opened on the 21st ult., after improvements and additions. These consist of new vestries and organ. The vestries are situated at the western end of the church, and provide accommodation for a choir of thirty men and boys, with a separate robing room for the clergy. These are entered through a large narthex. The architect was Mr. W. Watkins, of Lincoln, and the contractors, Messrs. Pattison, of Ruskington.

**BAPTIST CHAPEL AND SCHOOLS, FAR COTTON, NORTHAMPTONSHIRE.**—The foundation-stones of a new Baptist Church and Sunday-schools have just been laid at Far Cotton, Northampton. The architects of the new chapel are Messrs. Stevenson & Dorman, Northampton. The cost is about 3,000l.

**CHURCH, GREINA.**—The work in connection with the erection of the new church at Greina has just been commenced. The building will be situated at the corner of four roads between Greina Green and Springfield, and will accommodate over 200 persons. It is being erected from designs prepared by Mr. T. Taylor Scott, architect, of Carlisle. The contractors selected for the various trades are:—Mr. James Rae, builder, Ecclefechan; Mr. A. Tweedie, joiner, Annan; Messrs. Miller & Son, plumbers, Annan; Mr. McCulloch, painter, glazier, and decorator, Annan; Mr. C. J. Nanson, slater, Carlisle; and Mr. W. Norman, plasterer, Carlisle.

**PROPOSED EXHIBITION, CARDIFF.**—A meeting of the general council of the Cardiff Exhibition was held in Cardiff Town-hall on Monday, when Mr. E. Seward, the architect, submitted plans and suggestions for the construction of the proposed exhibition buildings. The plan provides four chief ranges of buildings forming courts, south, east, and west, enclosing a central open court of 184 ft. by 162 ft. Around this it is proposed there should be a promenade covered way gallery. In each case the buildings are set out to contain a central nave of 50 ft. space, with side aisles of 15 ft. width. The central portion of each court would also be provided with a gallery on the first floor. Regarding the fine art department, which will form the central entrance, brick will be employed. The two entrances on the right and left may be similarly dealt with, but the remainder of the buildings will be of corrugated iron. In the concert-hall spaces had been provided for audiences of about 2,000 and 200 in the orchestra, but in view of future exigencies, the space could be extended to provide for 4,500 or 5,000 people.

**BUILDING EXTENSION IN LEEDS.**—The annual report of Mr. Hainsworth, Inspector of Buildings, which has been prepared for the Leeds Building Clauses Committee, shows that the 2,017 new buildings approved include 9 villas, 30 semi-detached villas, 586 through houses, and 1,392 back-to-back houses. Among 45 miscellaneous plans were two churches, four chapels, one addition to church, two additions to chapels, five mission-rooms, a synagogue, four schools (two with swimming-baths attached), seventeen additions to schools, and other buildings of a public nature. Seven informations in the course of the year were laid before the magistrates for infringement of the laws, convictions being obtained in three cases, while the others were withdrawn, as the defendants complied with the necessary requirements.

**MEMORIAL CHAPEL, HIGHER TRANNERE, BIRKENHEAD.**—A chapel has just been provided for the inmates of the Birkenhead Union Workhouse, Higher Trannere, as a memorial of Colonel Vincent Ashfield King. The chapel is situated at the north end of the workhouse. It is approached from the main internal central corridor of the main building, and opens into a porch. The chapel is seated with open pitch pine pews to seat about 300 worshippers, and consists of a nave 63 ft. by 24 ft., north and south transepts each 14½ ft. by 9 ft., chancel 20 ft. by 18 ft., and a vestry. Special pews have been arranged for the master and matron in the transepts, and also seats for the visitors. The floor of the church is laid with wood blocks, the chancel being tiled, and the sacrum with encaustic tiles. The font is the old font from Oxtou Church. It has been reworked and slightly reduced in size. Externally the church is built of grey brick and red stone, to harmonise with the main building of which it is now a part. The roof is slated with Bangor slates. Mr. John Thomas, of Oxtou, was the general contractor. Mr. Samuel Günning was clerk of works. Messrs. J. R. Cooper & Sons have executed the heating and lighting, assisted by Mr. John Thomas; Mr. Joseph Rogerson the carving of the corbels, and Messrs. Norbury & Co. the communion fittings. Mr. J. Francis Doyle, of Liverpool, was the architect.

**PROPOSED NEW CHURCH AT TREHARRIS.**—Plans have been prepared by Mr. J. L. Pearson, R.A., London, of a new church for Treharris,

**CHANCEL SCREEN, ST. PAUL'S CHURCH, BRENTFORD.**—The chancel-screen and gates recently erected at St. Paul's Church, Brentford, to the memory of the late Mr. Stephen Walker, have just been dedicated. The screen is of oak and rests on the stone wall between the chancel and the nave, and extends the full width of the arch. It is composed of six arches resting on octagon columns and supporting a horizontal frieze and battlemented cornice. Each of these arches is divided into two sub-arches on circular shafts. In the centre (over the gateway) is a large arch forming the passage-way for transit through the screen. The whole is surmounted by a cross in the centre. The wrought-iron gates are made to fold back over the steps during the time of service. Iron grills of the same design are also fixed on the stone wall between the oaken shafts, and these range with the top of the gates. The architects are Messrs. Shearburn, of Dorking, and the builders, Messrs. Dorey & Co., Brentford.

**FEVER HOSPITAL, SHOOTER'S HILL.**—On the 31st ult. the foundation-stone was laid at Shooter's Hill of the first of a series of new fever hospitals about to be erected by the Metropolitan Asylums Board. The site of the institution comprises thirty-two acres, of which about two-thirds will be occupied by the hospital, and accommodation will be provided for 500 patients who may be suffering either from scarlet or enteric fevers or diphtheria. The cost of the new hospital, including drains, roads, yards, and boundary walls, is estimated at about 200,000l. Mr. T. W. Aldwinckle is the architect, and the contracts for the buildings, which will be lit throughout by the electric light, have been given to Mr. C. Wall, Messrs. Shillitoe & Son, and Messrs. H. Wall & Co.

#### SANITARY AND ENGINEERING NEWS.

**BRIDGE OVER THE WYE AT SELBACK.**—It is proposed to erect a steel rope suspension-bridge over the River Wye at Sellack, in the County of Hereford. The plans are for a bridge, with a clear span of 180 ft., and approaches on either side, and have been prepared by the architect, Mr. Ernest Davies, of Hereford.

**SEWERAGE WORKS, WHITCHURCH, CARDIFF.**—At the general meeting of the Cardiff Rural Sanitary Authority on the 11th ult., Mr. Fraser, A.M.I.C.E., the Engineer and Surveyor of the Authority, reported the contracts Nos. 3 and 5 of the Whitchurch sewerage had been completed. Mr. F. Ashley, of Cardiff, had satisfactorily executed contract No. 3 at a cost of 740l. 17s. 8d., being 11l. below the contract amount. Mr. John Mackay, of Newport, Monmouth, had satisfactorily executed contract No. 5 at a cost of 692l. 2s. 12d., or 32l. 6s. 2d. below the contract amount. Mr. Fraser also reported that contracts Nos. 1, 2, and 4 of the same work, being executed by Mr. E. J. Ince, of Cadoret, were progressing fairly, but that very important work had yet to be done in crossing the canal three times and the Taff Vale Railway at an important point. The engineer also submitted plans for the sewerage of East Brook and Dynas Powis at an estimated cost of 3,300l. The scheme was considered to be the best for the present and future requirements of the district.

#### STAINED GLASS AND DECORATION.

**WINDOW, WEST BROMWICH.**—On the 15th ult. a new stained glass window, which has been placed in the chancel of St. John's Church, West Bromwich, in memory of the late Mr. Richard Morris, was dedicated by the Rev. E. C. Carpenter. The window forms part of a series of subjects representing the burial and resurrection of Christ, and is the work of Mr. S. Evans, of West Smithwick.

**MEMORIAL WINDOWS, KIDDERMINSTER.**—The dedication of the memorial windows which have been placed in the clearstories of the Parish Church at Kidderminster took place on the 26th ult. The memorial consists of 12 windows, which have been designed and executed by Messrs. Hardman, Powell, & Co., of Birmingham.

#### FOREIGN AND COLONIAL.

**FRANCE.**—M. Roux, pupil of M. Cavellier and M. Barrias, has obtained the "Grand Prix de Rome for Sculpture."—A committee has been formed to raise a statue to the Paris to the memory of Toucville.—The Académie des Beaux-Arts has awarded the prize founded by M. Bailly, the architect, in recognition of the best completed architectural work of the year, to M. Hardy, for his work at the church of Notre Dame at Lourdes.—At Château Neuf de Randon, on the 19th a statue to Duguesclin is to be inaugurated.—M. Adrien, architect, of Chalon-sur-Saône, has obtained the first premium in the competition opened by the municipality of Autun for a new Savings' Bank. The second premium was awarded to M. Truchot, of Autun.—The town of Douai is about to expend about 400,000 fr. in important structural improvements, particularly connected with the demolition of the fortifications.—At Nancy an interesting exhibition of local decorative art

has just been opened.—At Pauillac, at the mouth of the Gironde, a long iron floating pier is being constructed parallel to the bank of the river, and connected with the bank by foot-bridges, which will enable large ships to discharge where the banking up of the sand at present renders it impossible.—The Fine Art Society of Nice is organising an exhibition to be held during the first three months of next year.—In Rue Suger, Paris, during the progress of some street excavations, a metal coffin has been discovered containing vases of antique pottery, and a red brick with a band of green and yellow enamel in the centre. The objects found have been placed in the Carnavalet Museum.—The last touch has been put to the model being erected at the Ecole des Beaux-Arts to the memory of Duban, the architect. The monument, which stands in the centre of the "Salle de l'Hémicycle," is entirely the work of M. Guillaume, the sculptor, director of the French Academy at Rome. It consists of a pedestal of white marble partly carved into the form of an infantine caryatide, supporting a bronze bust of the eminent architect in front of a background of marble carved with branches of laurel. On the right and left are the titles of his principal works; the restoration of the Château de Blois, in 1845, those of the Sainte Chapelle and South façade of the Louvre, and the Château de Dampierre.—In the Musée Carnavalet is a model of the pavilion of the Tuileries, which formerly decorated the Fontaine St. Ambroise, demolished when the Boulevard Prince Eugène was made. It represents "La Charité Offrant à Boire à de Jeunes Enfants." The Paris municipality has definitely settled the special applications of the new museums of the city. That of the Pavillon des Tuileries is to be devoted to painting, sculpture, engraving, and pastel, and also the fine collection of ancient tapestries belonging to the city. The Musée Galliera will be devoted exclusively to modern art, and will include the works acquired every year at the Salons, more especially those which represent decorative and industrial art.

#### MISCELLANEOUS.

**SCOTCH PROPERTIES FOR SALE.**—The Glencoe estate, Argyllshire, about 6,300 acres, and embracing the mountain known as "The Pap of Glencoe," Aulchallich grouse moor, and the Falls of Coe, Glencoe, in Lorn, lying at the head of Loch Etive, extends north-westwards for about ten miles to Ballachulish on Loch Leven. Much of its scenery is described in Macpherson's "Ossian." The peculiar name of Fingal's domain is Morven—Con-fion, or Hill of Fingal, is on the north side of the vale through which runs the "roaring stream of Cona"; at the vale's north-west end is the scene of the massacre in the night of February 13-14, 1691, of the Macdonalds, by Captain Campbell of Glenlyon, and his party of military. The Drumcruick estate, Kirkcudbrightshire, wherein stands the castle which, with the barony, passed to the Maxwells on the marriage of Agnes, daughter of Lord Herries of Terregles to Sir John, son of the fourth Lord Maxwell. Having since belonged to the families of Irving, Hynd, and Heron, it reverted twenty years ago to the Maxwells. The castle stands three stories high, with an attic in the roof, measures 36 ft. by 29 ft., and has a vaulted kitchen for ground floor, with one apartment in each of the floors above. The staircase tower, rising above the landing on to the battlements, contains a little guard, or watch, room. In their work upon the Castellated and Domestic Architecture of Scotland, Messrs. David MacGibbon and Thomas Ross point out a peculiarity of the fabric: the tower angles are played away, and, as the walls generally are, built of small rubble, with a larger stone here and there. They are of opinion that it was built about the middle of the sixteenth century.

**THE CARPENTERS' COMPANY.**—In the secretary's report to this company for the past year, it is mentioned that "the premises which were mentioned in the last report as having been taken in Great Titchfield-street were opened in October last. They are called the Carpenters' Company Trades Training School, and no one is admitted as a student who is not absolutely engaged in the trade for the benefit of which the class is established. Up to the present time the company have received and have been teaching their respective trades are the following:—The Tylers and Bricklayers, the Wheelwrights, the Painter Stainers, the Plasterers, and the Masons, so that there is instruction being given in each of the above trades, and in carpentry and joinery, which classes are carried on by the Carpenters' Company. The Institute of British Wood Carvers has taken the upper end of the building, and the increased accommodation which they have, compared with that at Chapel-street, is a great advantage to the students. The number of students in all the classes since the commencement is 140."

**"ELEVATOR" CARS.**—The Otis Elevator Company are now making the travelling cars for their lifts largely of decorative open wrought-iron work. Carvers of the designs, and the illustrations have been sent to us, are very creditable in design as far as the wrought-iron work is concerned. They are, of



course, glazed where the open work is used. The object seems to be to give the cars a more decorative appearance as seen from the outside.

**FOOTPATHS.**—In the annual report of the Borough Surveyor of Richmond, Mr. Lovegrove, we observe mention of a new and economical way of treating footpaths. The report says: "A new method of treating gravelled paths was introduced in Kew-road, where the foot traffic renders it almost impossible to keep the stones down; a length of path opposite the Athletic Ground, and also across New Green, was simply brushed over with tar and covered with sea-shell, the cost being about 2½d. per yard super., and in result a smooth, even path was obtained. Now that the Town Council have the maintenance over two-and-a-half miles of river path, this would be the most economical and satisfactory way of dealing with the walk."

**NEW FORM OF DUST-TRAP.**—Messrs. Hall, Beedell & Co. send us a description and illustration of a new form of semicircular metal hopper for communication with a dust-shoot. It is fixed in the wall of the shoot, so as to turn horizontally on its axis, which is flush with the wall face. A handle at right-angles to the axis gives it a quarter-circle turn outwards, disclosing the opening of the hopper or box, in which the dust is deposited; by reversing the handle the dust is discharged down the shaft, and at the same time the hopper opening is closed towards the exterior of the shaft, thus preventing the dispersal of dust particles in the air. It seems a simple and useful patent.

**NATIONAL ASSOCIATION OF MASTER BUILDERS OF GREAT BRITAIN.**—The National Association of Master Builders of Great Britain held its Thirty-third Half-yearly Meeting in the Mayor's Dining Room, Town Hall, Bolton, on the 24th ult. The President, Alderman John Bowen, J.P., Birmingham, the President-elect, and representatives were present from London, Liverpool, Birmingham, Manchester, Huddersfield, Northampton, Derby, Leicester, Bradford, Leeds, Bristol, Hull, Preston, Bolton, Wigan, Burslem, Hanley, Tunstall, Longton, Walsall, and Southport. The Council reported having issued to the members the customary tabulated statement of hours worked, state of trade and supply of labour in the principal towns in the United Kingdom. The report for the past half-year was read and discussed, and ordered to be printed and circulated. The Treasurer, Mr. C. W. Green, Liverpool, in submitting his statement of accounts for the past half-year, congratulated the Association upon its sound financial condition. The Council reported that the form of contract now under consideration had not yet come to a satisfactory issue, but it was hoped that the Royal Institute of British Architects and the Institute of Builders, who had the matter in their hands, would do their utmost to bring the matter to a close as speedily as possible. Alderman Jessop, Huddersfield, gave a short description of the dispute with the masons, and expressed his opinion that the rule, now in force in many places, prohibiting worked stone being brought in the town, acted very prejudicially to all parties concerned, and expressed a hope that the members would do all in their power to get such an objectionable rule as this expunged. Several other matters of special interest to the building trade were brought forward and discussed, and it was decided to hold the next meeting at Birmingham.

**ST. MARY'S CHURCH, NORTON-SUB-HAMDON.**—On the morning of the 29th ult., the tower of this church was struck by lightning. The whole of the inside, consisting of a peal of bells, a clock, the chimes, with all the wood and lead work, were in a short time destroyed by fire. But for the timely arrival of the fire-engine, with the rapid efforts of the fire brigade, and the energetic assistance of all the parishioners who could help, the church would also have perished, with the exception of the stone walls. The walls of the tower stand, but are considerably injured.

**THE MANCHESTER SOCIETY OF ARCHITECTS.**—A valuable addition to the architectural works in the library of this society has just been placed on the shelves at 36, George-street—namely, thirty-five volumes presented by Mrs. Whitaker, the widow and executrix of the late William Wilkinson Whitaker, architect, of Cornbrook House, Manchester. The folio volumes include several works by Sir M. Digby Wyatt, "The Ecclesiastical Architecture of Italy," by Henry Gully Knight, "Henry VII. Chapel, Westminster," by Cottingham, and "St. Stephen's Chapel," by Mackenzie, and other valuable works. Mrs. Whitaker also supplemented her gift by a liberal donation in money for the purchase of other books.

**COMMISSION OF SEWERS.**—The Commissioners of Sewers, at the last meeting previous to the vacation, which concludes on September 25, had under consideration, among other matters, the question of appointing a representative to the International Congress of Hygiene at Leith, the erection of window-sashes in the City, and the scheme for supplying telephones to the citizens generally at a cost much less than is at present incurred by the users of telephones. After some demur on the score of expense, the Chairman, Professor Banister Fletcher, who has been elected President of the 10th Section (Hygiene of Dwellings) of the Congress of Hygiene, was appointed to represent

the Commissioners at the Congress. The report of the Sanitary Committee recommending steps to be taken without delay to introduce a Bill into Parliament to provide baths and wash-houses in the City worthy to be compared with similar establishments in other great cities of the world was again adjourned, the principal discussion turning upon the question of electric lighting. A year ago, the Commissioners passed a resolution not to consent to the use of certain tubes laid by the Electric Lighting Company for telephonic purposes, unless a guarantee was given by the company that telephones with double wires and all the latest improvements should be supplied to the citizens at a cost not exceeding 8s. a year. Mr. Pannell now moved that the resolution be rescinded, on the ground that the resolution blocked the way to any reduction in the charge now made by the National Telephone Company, which amounted to 20s. a year. After a long and animated discussion, Mr. Pannell's resolution was carried on a division by 33 to 14. Another matter which led to a long discussion was the continued delay in proceeding with the plans and estimates for the new offices proposed for the commission in Basinghall-street, in consequence of the opposition of the Guildhall Library Committee, who averred that if the plans were proceeded with great injury to the lights and approaches to the Library would result. The question was eventually left as it stood on July 17, for a conference to take place as early as convenient between the various committees interested.

**THE ROMAN WALL, CUMBERLAND.**—Some important excavations, says the *Manchester Guardian*, have lately been commenced on the line of the Roman Wall in Cumberland, under the superintendence of Professor Pelham, Mr. Haverfield, and other Oxford archaeologists, acting in conjunction with the local antiquarian society. The first object of the excavators has been to explore the Vallum and to trace the connexion between it and the Wall, and sections have been made accordingly at various places between Carlisle and Castledale. At Brunkston Park, about three miles east from Carlisle, trenches were dug from the north side of the Wall to the south of the Vallum. The foundations of the Wall were discovered, and close behind it the appearance of a paved footway. A few paces further south the diggers came upon the Roman road. The road was made with large stones in the centre and on the kerb, a clay basis, and a packing of freestone and clay, with gravel above. Further to the south lay the Vallum, with its ditch and three mounds, and immediately to the north of it a small ditch not unlike the *Graben* which the German excavators have lately found on the Limes. At Whittemoss, Bleatarn, and Chapelfield (near Irthington) other sections have been dug, with curious results. At Bleatarn a quarry has been traced, out of which the Wall was possibly constructed. In August further sections will be made in the eastern part of Cumberland, near Lanercost, and digging has also begun in Northumberland.

**DISPUTE IN THE BLACKBURN BUILDING TRADE.**—Another dispute has arisen in the building trade at Blackburn. When a settlement of a six months' strike was effected last November, the question of non-society workers was left in the hands of the men. The unionists have failed to induce non-society workers to leave the town or to join the local societies, and as the firms employing them have declined to discharge them, the unionists have withdrawn from firms employing non-society men.

## MEETINGS.

FRIDAY, AUGUST 3.

*British Archaeological Association.*—Annual Congress, Manchester (continued).

*Liverpool Engineering Society.*—Excursion to the Oswestry reservoir and filter beds, masonry dam, and tower, at Lake Vyrnwy.

SATURDAY, AUGUST 4.

*British Archaeological Association.*—Annual Congress, Manchester (concluded).

*Liverpool Engineering Society.*—Excursion (second day).

SUNDAY, AUGUST 5.

*Architectural Association Camera Club.*—Visit to Canterbury.

TUESDAY, AUGUST 7.

*Glasgow Architectural Association.*—Visit to Belmont Established Church, Hillhead.

## RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

51,010.—**WINDOW-SASHES:** *F. Brivley and another.*—This invention relates to a means or device for supporting window-sashes or frames within their casements in any desired position without the use of cords or weights. The invention is particularly adapted to carriage windows or sliding window-sashes and frames generally. A spring piece and a pulley or roller are main features in the invention.

51,014.—**DISINFECTING GULLIES:** *M. Miller.*—The object of the invention is to store disinfecting material beneath the gullies or gratings so that gases must pass over

the substance, or water or fluids must carry some portion into the drain. For this purpose a small tray, holding some disinfectant more or less soluble, is fixed under the grating of the gully.

1,633.—**SYPHON CISTERNS:** *W. Sharp.*—A novel arrangement acting by suction, in which a hood, a cover, and a stand-pipe are employed, causing a certain and quick flow from the cistern.

5,695.—**WATER-CLOSETS:** *R. Schleicher and another* (Munich).—Consists in forming an enlarged chamber behind the water seal at the bottom of the pan in which to retain the water for a certain time in order to effect a more complete decomposition of the same before it passes into the drain-pipes. The invention also comprises the arrangement of an easily detachable cover to inspection or cleaning chamber, by which the latter is easily accessible for cleaning purposes.

8,729.—**FRENCH WINDOWS:** *A. Levin* (Berlin).—A device to prevent the closing of sashes of French windows by pressure of wind, &c. It consists of a lever catch turned by a spiral spring around a pin fixed to the window-frame so that the catch enters into the space between the frame and the sash as soon as the latter has been opened.

9,171.—**SLIDING WINDOWS &c.:** *W. Whitley.*—Efficient and comparatively inexpensive means are provided whereby one sash counterbalances the other, and the coupling parts between the two are so constructed that they may be adjusted to meet any irregularities or differences between the relative positions of the sashes by which the mounting and fixing in position of the sashes is greatly facilitated. The fittings allow the lower sash to be readily dislodged or detached.

9,208.—**TRAVELLING HANGERS FOR DOORS, &c.:** *J. T. McCave.*—A cheap, frictionless travelling hanger on which a door or gate is hung so as it can be moved in a pre-determined direction with as small an expenditure of applied force as possible. A "hanger-strap" and ball bearings are essential features of the invention.

9,735.—**BLOWERS FOR VENTILATORS:** *E. Hochheim* (Germany).—An improved form of vane for a blower curvilinear with three curved surfaces—and an improvement in fixing them upon the shaft.

## NEW APPLICATIONS FOR LETTERS PATENT.

JULY 16.—13,655, J. Cuffing and others, Hand Circular Saw.—13,671, J. H. G. Gossens, Binding together the Framework of Windows or other similar Structures.—13,680, E. Highton, Syphon Water Waste-preventers for Flushing Purposes.—13,694, J. Spencer, Constructural Arrangements of Buildings.—13,701, T. Peard, Spring Centres for Swing-doors.—13,702, W. Perry, Central Ventilation for Dwelling-houses and Public Buildings.

JULY 17.—13,731, W. Ward, Turn-screw.—13,732, J. Shanks, Water-closet Apparatus.—13,735, S. Hazeland, Machine for Planing Wood.—13,782, N. Jennings and J. Morley, Water-closets and Apparatus for Flushing same.

JULY 18.—13,804, T. Robinson, Connecting Metal and Earthenware Pipes together, also applicable for Connecting Metal Pipes together.—13,806, E. Astle and C. Terry, Chimney and Ventilator Hood for Fixing on the outside of Chimneys, Ventilators, &c.—13,810, E. Kendall, Reversible Window-sashes and Frames.—13,813, W. Wilkinson and H. Alexander, Brick-making Machinery.—13,814, W. Wilkinson and H. Alexander, Brick and Tile Presses of the "Tidley" type, &c.—13,860, D. Dawson, Sash-fasteners.—13,867, H. Fletcher, Chimney-tops.

JULY 19.—13,889, C. Lea, Simple Door-handle.—13,926, J. Philo and others, Treatment of Wood for Preserving, &c.—13,945, E. Barger, Producing the Circulation of Air in Heating and Ventilating Systems, &c.—13,931, J. Bartlett, Nail for Securing Roofing Tiles, Slates, &c.

JULY 30.—13,950, H. Swann, Sash-stop and Window-fastener or Mortise Lock.—13,955, G. Atherton and J. Gare, Hand or Pad Saw.—13,991, W. Gibbin, jun., Window-sashes.

JULY 31.—14,018, J. Russell, Imitation Stained Glass.—14,027, H. Dawson, Sliding and Hinged Window-sash and Door-fasteners.—14,031, F. Stolte, Fireproof Ceilings and Floors.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

11,356, J. Bayly, Spring Door-catches.—12,295, J. Graves, Sheet-metal Mantels.—13,354, R. Hedges and S. Hill, Fastenings for Fanlights, &c.—12,457, B. Heymannson, Bottom Bolt Spring Socket for Folding Doors.—13,525, C. Whitehead, Attaching Door-knobs to their Spindles.—13,614, A. Dyson, Water-closets.—13,717, J. Holt, Combined Hammer and Screw-driver.—13,905, C. Knox, Roofing Tiles.—12,947, J. Summer, Attaching Door-knobs, &c., to their Spindles.—12,958, J. Keith, Radiators for Heating and Ventilating.—12,961, J. Lees and others, Wood-planing Machines.—12,995, P. Schmah, Ladders.—13,145, L. Josset, Luminous Paint.—13,782, C. Richardson and E. Herbert, Electric Light Ceiling Roses.

## COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

17,244, J. Mather, Ball Taps.—3,544, R. Baxendale, Chimney-pots, &c.

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

JULY 17.—By *J. Egginton*, in conjunction with *Debenham, Teulon, & Co.*: The Bere Court Estate, Pangbourne, Berks, f. farm, 103a. 2r. 30p. r. 764, 1,500l.; "Malden" head Hatch Farm, 312a. 2r. 13p. r. 1,351, 3a. 4,000l.; f. arable and woodland, 93a. 3r. 17p. r. 556, 1,700l.; f. building land, 58a. 3r. 14p. r. 4,250l.; f. agricultural land, 85a. 2r. 11p. r. 1,800l.; f. farm, 72a. 2r. 4p. r. 754, 2,500l.; "Pangbourne Marsh Farm," 120 a. 3r. 23p. r. 1,191, 1s. 3,100l.; f. meadow land, 44a. 2r. 6p. r. 261, 2,500l.; "Woodborough House," r. 351, 650l.; "Mill House and Corn Mill," 2a. 1r. 37p. r. 1,500l.; "Shooter's Hill House," 11a. or. 31p. r. 1,804, 7s. 8d. 5,500l.; part of "Pangbourne Wharf," 0a. 3r. 25p. 400l.; a plot of land, 0a. 1r. 36p. r. 500l.; f. meadow land, 61a. 3r. 24p. r. 200l.; two f. houses with shops, r. 531, 10s. 1,500l.; five f. houses, 1,580l.; f. house and numerous cottages with gardens, 3,425l.

JULY 23.—By *H. Hemming*: "The Buttercotes Estate" of 368 a. 3r. 28p. near West Grinstead, Sussex, f. 1,500l.—By *F. Haddock*: "Gladstone House," Western, Mitcham, f. r. 341, 500l.; "Wharfedale Road," West Croydon, f. 1,800l.—By *Harman Bros.*: 20, Dunsmure-d.



## CONTRACTS—Continued

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tender to be received.
Additions to Beach Inn, Park Lane, Warwick.	T. E. C. Black.	do do do do do	Aug 11
Two new houses, Newcastle, Durham.	Alfred M. Cram.	do do do do do	Aug 12
Two new cottages, East Main, Topsham.	do do do do do	do do do do do	do
Public houses and twenty pigsties, Rensselaer Co., New York.	Mortley Tiddell Lock, B. H. Brown & Co.	do do do do do	do
Mortgage of house, Newburgh.	do do do do do	do do do do do	do
Water supply.	do do do do do	do do do do do	do
*Supply of Road Materials, Carlisle, &c.	S. W. Jenkins & Son.	do do do do do	do
*Painting Sheds, Haverhill.	do do do do do	do do do do do	Aug 13
*Painting Sheds, Haverhill.	Cent. Leach Soc. Vols.	T. M. Bates & Co.	Aug 13
Bridge, Boscawen, &c.	do do do do do	A. G. Latham.	Aug 13
Bridge, Boscawen, &c.	do do do do do	W. M. Thompson.	do
Bridge, Boscawen, &c.	do do do do do	Joseph Bowman.	do
Bridge, Boscawen, &c.	do do do do do	do do do do do	do
Water Reservoir, Drifden, Lancr.	do do do do do	Bond & H. Smith.	do
	do do do do do	J. F. Emery.	do

## PUBLIC APPOINTMENT

Nature of Appointment.	By whom Advertised.	Salary.	Applicants to be in.
*County Surveyors (Ireland) .....	Civil Service Com .....	.....	Aug

Those marked with an asterisk (\*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv., vi. and viii. Public Appointment, pp. xviii and xx.

PRICES CURRENT OF MATERIALS.			
TIMBER.		TIMBER (continued).	
Greenheart, B.G.	ton	8 0/0	0 0/0
Teak, E.I., load	10, 20	16 0/0	
Satin, Porto Rico		0 0/0	0 0/0
Walnut, Italian		0 0/0	0 0/0

JULY 27.—By *E. Smith & Co.*: Nos. 45 to 66 and 60A, Vauxhall Bridge-rd., and 1 to 7, Carey-pl., u.t. 63 yrs. g.r. 4l. 11s. 8d., 1,950l.—By *Jenkins & Son*: 361

Caledonian-rd., Islington, u.t. 48 yrs., g.r. 8l., r. 46l., 305/  
—By R. Reid: l.g.r. of 100l. 10s., Cathcart-st., &c.  
Kentish Town, u.t. 27 yrs., g.r. 21l. 4s., 1,070l.; i.g.r. o

PRICES CURRENT OF MATERIALS.			
TIMBER.		TIMBER (continued).	
Greenheart, B.G.	ton	8 0/0	0 0/0
Teak, E.I., load	10, 20	16 0/0	
Satin, Porto Rico		0 0/0	0 0/0
Walnut, Italian		0 0/0	0 0/0

[illegible]

1st .....	0/9 6	0/14/6	
Do. 2nd.....	0/7/0	0/11 6	
Other qualities.....	0/5 0	0 6 6	

Cedar, Cuba, &c.	73	141	Cranston, Corbin	23	21
Honduras, &c.	73	141	Do, Ceylon	23	10
Hahogany, Cuba	73	18	Palm, Lagos	23	10
St Domingo,			Raymond, English		
Sancti Spiritus	73	16		23	21
Mexico do do.	73	14	Do brown	73	31
Tobacco do do.	73	15	Cottonseed ref.	73	31
Honduras do.	73	15	Oleins	23	10
Box, Turkey ton	46	5	Lubricating, U.S.	4	5
Do do do	73	18	Do refined	5	12
Bahia	73	17	TAR - Street		
Patent, St. Do.			barrel	4	5

## TENDERS.

[Communications for insertion under this head should be addressed to "The Editor," and must reach not later than 10 a. m. on Thursday.]

ABERCAVENNY—For additions, &c., to school books, Ilangatock-nigh-Usk, for the School Board, Mr. Robert Jones, Aberystwyth.

L. Grinnell Abernethy, 1833, *Trans. Zool. Soc. Lond.* 1: 111. (2)

the Managers of the said and said  
H. A. Vanett & Sons And for the sum of £200

LILLYTOL for the creation of a 1 1/2 mg. Merrywe  
 Begunster for the Nelson, Pearl, Mr. Edward  
 architect —

Hatherly & Carr..	£13.434	6
J. E. Davis.....	1	0

Perkins.....	13.08	44
Perrier.....	1.00	1
W. Cowlin & Son...	1.00	25
A. H. Perse.....	1.00	1

H. J. Rossiter .....	1	1	.....	5
E. Love .....	1	1	.....	11
G. Dwyer .....	4	3	.....	7
G. H. Wilkins .....	2	.....	.....	2

7. Winters	11	6	1	45
A. J. Beeson	12	9	1	850
G. Humphreys	11	6	1	7

\* Accepted.

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# The Builder.

VOL. LXVII. No. 2683.

AUGUST 11, 1894.

## ILLUSTRATIONS.

Competition Design for Christ's Hospital Schools.—By Messrs. Paley & Austin.—General View of Buildings	Extra Large Photo-Litho.
Plans, Sections and Elevations	Extra Large Photo-Litho.
Plans and Sections of Residential Houses	Extra Large Photo-Litho.

## Blocks in Text.

East End of Outer South Aisle, All Saints' Loughborough.....	PAGE 90	A Bay Window from South Wingfield.....	PAGE 107
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### An Old Problem in a New Light.



NE may be held excused for feeling some bewilderment as to what kind of division of architectural history is to be presented to us in a book bearing the title "Three Periods of English

Architecture." The architectural history of this island has been a good deal punctuated. There is the broad division, ignoring the aboriginal Saxon, which divides it into four periods—"Norman," "Early English," "Decorated," and "Perpendicular." There are those who interpolate "Transitional" between the first and second term of the series, which would give us five; but those who regard it thus, generally also divide "Decorated" into two periods, Early and Late, called more precisely "Geometrical" and "Curvilinear." There we have six periods—a recognition of Saxon at one end gives us seven, and "Debased" at the other end brings it up to eight; while the division of Late Gothic into "Perpendicular" and "Tudor" would bring it up to nine. But the three periods of Mr. Harris' form an altogether new analysis. And the nomenclature is as new as the numerical division, for the periods are distinguished as "At Work," "Asleep," and "Awaking." Evidently "the bearings of this lie in the application." Three times over in the present century we have been quite certain that we were awaking. We had a Greek awaking, and built St. Pancras Church. We had a Gothic awaking, and built St. Pancras Station, besides restoring many cathedrals and scoffing at St. Paul's. We have had a Renaissance awaking, when we began to worship St. Paul's and Wren architecture generally, and built many brick houses with pilasters on their fronts. One may take it however that when anyone speaks of the awaking of his own art, he refers to the present. Many generations of artists in many lands have each successively believed that "now is the accepted time." The awaking is always what one happens to be doing at the moment. But when was English architecture more especially "at

work"? The natural and rational answer seems to be, during the development of our Mediæval styles. That was surely the great architectural work of England. But our present author is regarding the matter entirely from the modern or Renaissance standpoint. His "at work" period is the time when the decaying forces of Mediæval architecture were struggling with the new forces of the Renaissance. His "asleep" period is when the struggle was given up, and the Gothic spirit finally decamped and left the field to conventional classicism. The "awaking" has come with the revival of the struggle for the fusion of Gothic and Classic elements going on at the present moment. Had the struggle not been abandoned in the seventeenth century, a new development of architecture might have taken place. Under the newly-revived free Classic it may still take place. Let us wipe out what has gone between, and resume our labour where we left off a century or two back, and see what we can arrive at. In short, it is the old question of a new national style, confronting us with rather a new face. Much the same thing was urged by the renovators of thirteenth-century Gothic. We were to hark back to the best period of our indigenous style, and see how we could work it out afresh. Perhaps the prospect is better now than it was with the Gothic revivalists, inasmuch as the latter, in the purist era of Street and his contemporaries, were proposing to start again with a style so logical and complete in itself that it was difficult to know how to develop it further without merely spoiling it. The fusion of the elements of two semi-decayed styles affords, at all events, more scope for new development.

A good deal of this, of course, one has heard very often already. Mr. Harris, however, professes that it has not been his aim to formulate a distinct theory of his own, but rather to bring together a great deal which has been said by other people in favour of architectural progress. Accordingly, his book consists largely of extracts from the writings and speeches of other architects who have at various times delivered their minds on this subject, and a very extraordinary "confusion of tongues" is the result. So far from finding any consensus of thought in one direction, we seem to have only evidence how various and

contradictory have been the utterances on this subject during the last twenty or thirty years. One of the earliest quotations in the book is one from Fergusson in regard to the architecture of such buildings as Hatfield House and others of the same period. We cannot call such buildings he says (and truly, so far) either Gothic or Renaissance:—

"It is only here and there that we are reminded, by a mis-shapen plaster or ill-designed arcade, of a foreign influence being at work, and these are so intermingled with mullioned windows and pointed gables that the buildings might with equal propriety be termed Gothic; the fact being that there is no term really applicable to them but the very horrid, though very characteristic name Jacobean. As designs, there is really nothing to admire in them. They miss equally the thoughtful propriety of the Gothic and the simple purity of the Classic styles, with no pretensions to the elegance of either. All they can claim is a certain amount of picturesque appropriateness, but the former quality" (the picturesqueness, we presume) "is far more due to the centuries that have passed away since they were erected than to any skill or taste on the part of the original design."

This reads curiously enough at the present moment, and is certainly hardly calculated to support the general view maintained by the author. This view, if we extract it correctly from amid the maze of quoted opinions, is in the main a reasonable one. It is that the partial fusion of Renaissance with Gothic features, in or about what we now call the Jacobean period, gave the basis for working out a new style, which was abandoned and lost owing to the adoption of conventional Classic forms in a mere spirit of imitation, followed by the successive adoption of one style after another as the purest and best to take up again. Mr. Harris urges that we should regard the style of architecture which is now becoming prevalent under the name of "Free Classic" as the opportunity for taking up again the problem that was dropped in the early period of the Renaissance, and endeavouring to work out that fusion of the elements of Gothic and Classic into the development which it might have reached by this time if it had been systematically carried on from the outset, instead of being abandoned for conventional or archaeological Classic. He gives two plans on Plate I., the ground plan of Smithills Hall, Lancashire (fourteenth, fifteenth, and sixteenth centuries), and that of Stokesay Court, Shropshire, labelled on the plate "1889: by the author." There is some confusion between the plate and the

• "Three Periods of English Architecture." By Thos. Harris, F.R.S.E.A.; F.Sac.I. London: B. T. Batsford. 1894.

text: the latter mentioning "the Stokesay Court, Shropshire, and Pooley Hall, Warwickshire, date 1509." Only one plan is given under "b," labelled "Stokesay Court, 1889," as just mentioned. There seems to be some oversight in the text, but we take it that the plate is correct, and that the author means to compare an old plan of a house in the favourite  $\Pi$  form, surrounding three sides of a quadrangle, with the modern house treated according to the same general idea in plan; as he adds, "the reflection must have struck many minds—what form would the elevation have assumed through these intervening years; and more especially, what form would it in all probability be wearing at this time, had not the Tudor been supplanted by the Renaissance?" . . . . The speculative character of the thought is undeniable, and yet it opens out such a vista of what *might* have been, that it ought not to be altogether idle to reflect upon the causes which prevented a further development, and but for which we should have been in possession of a style which would have claimed unbroken descent from that of our forefathers, instead of being saddled with a foreign style unknown to them. . . . We do not know what form the sixteenth-century Gothic would have assumed at the close of the nineteenth century had its development been uninterrupted, yet this is the problem the solution of which living architects would do well seriously to attempt.

This seems to suggest two ideas which are not quite reconcilable. For the author speaks of the early mingling of Classic forms with Gothic as the basis of a new development, while in the above passage he seems to regard the further development of Gothic as the ideal object. The mixed style of the Early Renaissance in this country, and in France at an earlier date (Francis I.), was in itself an interruption of the development of Gothic. Apart from this, was any further development of Gothic possible? Mr. Harris suggests in this connexion a somewhat new consideration, viz., did Gothic really die of inanition—of its own weakness as a worked-out style? And he remarks, with some point, that a style could scarcely be said to be moribund which produced such buildings as Henry VII.'s Chapel and King's College Chapel. "Never surely," he observes, "did decrepitude simulate vigour so successfully as in such buildings as these." But if that view be taken, the conclusion would be that we should eliminate the Renaissance element altogether, and proceed to develop Tudor architecture on its own lines. This hardly harmonises with other suggestions in his book; but we may thank him for suggesting a new idea in regard to the close of Gothic architecture in this country. Suppose we could have shut out this island altogether from the influence of the Renaissance, might there have been a further development for pure Gothic from the point reached in Henry VII.'s Chapel? The question is at least a very interesting subject of speculation; the mere putting of it suggests a revival of the current ideas as to the fall of Gothic architecture; a speculation as to whether the poor stuff called sometimes "Debased" Gothic was due not to the inherent inability of the style for further development, but to the intrusion of the Classic ideal, which drew away the artistic mind of the nation from the further possibilities of its natural style, and therefore left that to linger out into decay, not so much from want of inherent vigour as from neglect in favour of a newly-introduced element of design. Certainly it is a curious point, when we come to think of it in this light, that buildings so remarkable and so perfect in their way as those two famous Tudor chapels should have had so little influence on the immediately succeeding period; that Gothic should have come to such a splendid achievement as this and then stopped and died out. The suggestion is a very interesting one for students of the history of architecture, and

seems to open out a new view of this part of the subject.

The Renaissance, however, did intervene, and what Mr. Harris regrets is that it was allowed to intervene in a drastic and intolerant manner, pushing aside all the remnants of the old style. And here from out of the "confusion of tongues" we have another quotation from Fergusson, entirely overthrowing the one previously referred to. It is not much more difficult, indeed, to find contradictions in Fergusson than in Ruskin, but after previously reading the quotation we have given above, in which the Early English Renaissance is dismissed as presenting nothing whatever for admiration except a picturesqueness due chiefly to antiquity, it is certainly rather startling to find in this other quotation that the English "have some reason to be proud of their Transitional style:"—

"It has not either the grandeur of the Italian, the picturesqueness of the French, nor the richness of detail which characterised the corresponding style in Spanish; but it is original and appropriate, and, if it had been carried to a legitimate issue, might have resulted in something very beautiful. Long before, however, arriving at that stage it was entirely superseded by the importation of the newly-perfected Italian style."


Who shall decide when doctors disagree—not only with each other, but with themselves? Before we read that the English Transition had missed the good qualities of both styles, Gothic and Classic; now we read that it might have been a beautiful style had it not been cut short by the introduction of pure Classic. The latter view is apparently that of our present author. If instead of abandoning the buttress for the attached column and pilaster, "they had subjected it to a modifying process"; if, instead of discarding tracery, they had practised such a treatment of it as was imitated at Layer Marney, for instance; if, instead of borrowing entablature and balustrade, the pierced parapet, watertables, decorated friezes, &c., had been retained and treated "in some such way as was feebly attempted at Sutton Place" (of which a sketch is given), would not the old style have been living now? Perhaps so; but that would have required that England should have been entirely isolated from continental connexion and influence. Now, however, that we seem really beginning to regard architectural style as a subject for thought to some extent, and not for mere imitation, there is some chance that this view of the possibilities of architecture based on the early beginnings of a Transition style might be developed. The gist of Mr. Harris's advice would seem to be this: that in working out the elements of our free Classic style, we should lay more stress than we are now doing on the Gothic element in it; that element, so early wiped out in the part, but surely capable of more than has yet been extracted from it in this connexion. At present we are still very largely making use of the entablature and balustrade and the other properties of Classic architecture, in a mere imitative manner as regards detail, only applying them in an irregular, illogical, picturesque kind of manner which is Gothic only in the sense of being irregular and unsymmetrical in its mode of application, but is otherwise the copy of Renaissance detail, often not of the best description. The liking for this kind of design is probably only a passing taste, for it is founded on the desire for piquancy and variety rather than on any broad principle. Mr. Harris wishes, if we understand him rightly, to recall to our notice the Gothic element in the early Transition style; to aim at a development of Late Gothic rather than an application of scraps of Classic on buildings which avoid Classic symmetry in their main design. There is a great deal to be said for the suggestion, and we commend it to the consideration of our readers.

The other main point in the book is the subject, dealt with at considerable length in

the "Awaking" chapter, of the use of iron and steel in modern architecture. The author is evidently very decisively in favour of this element in modern architecture, but in the numerous quotations of opinions which he gives us the "confusion of tongues" is more bewildering than ever. Street repudiated iron entirely, on the ground that one main principle in Gothic architecture (which alone he believed in) is to show the construction; and he assumed as a matter of course that iron could have no visible part in Gothic design. Scott, on the other hand, thought that an iron roof and an iron bridge were more allied to Mediaeval timber construction than to any works we know of Classic antiquity; and here he was certainly right. The Forth Bridge is far more allied to the spirit of Gothic than to that of Classic. That, however, did not prevent Scott from using concealed iron in a most illogical way, had almost said immoral, manner in the Albert Memorial. A good deal of what Mr. Harris says on the subject is worth reading and considering, and the collation of quoted opinions of all kinds is in itself very amusing. But it does not convince us that anything much worth calling architecture, in the highest aesthetic sense, will come out of the extensive adoption or adaptation of iron. The author says, "Is not metal as natural a material as stone, brick, and wood?" We should say, certainly not; it is not found in the state in which we use it; it is prepared from crude materials by smelting and Bessemerising, &c. Stone is a natural material merely shaped for building purposes; it harmonises with nature in a way that iron will never do. And iron does not harmonise either with a masonry architecture. In the hall of the Natural History Museum the iron principals spoil the total impression of an otherwise fine interior. The iron arches and stone piers of Westminster Bridge are not satisfactory to the eye or the critical sense; the iron (so-called) arches in the gateways of the Tower Bridge, with masonry erected on them, are equally unsatisfactory. An iron architecture of a kind there may be, but hardly an architecture in which beauty is a main consideration. It appears to us that iron will have to stand alone on its own merits, and cannot come into monumental architecture. It will not "mix." In the Forth Bridge, treated in a simple constructional manner, it is impressive in its way; it might have been so in the Tower Bridge if the edict to make a sham effect of masonry had not gone forth. But, though we are open to conviction, we do not as yet see any probability of iron lending itself to any new architectural style or manner which would be worth much from an artistic point of view, either in itself or in combination with other materials.

We recommend the perusal of Mr. Harris's book to architects, however, both for the thoughtful suggestions by the author which are contained in it, and for the curious collection of multifarious opinions about modern architecture, which are comprised in its numerous quotations, and which leave one in doubt whether any single view has been laid down about modern architecture by one architect which will not be found to have been contradicted by another. The morab perhaps is that a little good building is worth more than a great deal of talking.

#### NOTES.

 THE competition for the new museum of Egyptian antiquities at Cairo is open to all architects, and the result ought to be of considerable interest. It is not, however, quite satisfactory to find that all the premiated designs (the first at 600*l.*, and the four next at 100*l.* each) are to be the property of the Egyptian Government, which is to have the right to do what it pleases with them, while the engagement of the first premiated architect to carry out the building is only indicated as a possibility, if the



Egyptian Government is so minded. Promoters of competitions seem to be everywhere alike; "colum non animum mutant." A plan of the ground is given, but no levels. Another rather puzzling point is that the building is to be in two stories, both containing exhibition galleries, the lower for large and heavy objects, the upper for smaller ones; but yet the instructions say "Toutes les salles d'exposition seront éclairées par en haut." This certainly can hardly mean top-lighting-in the case of the lower story; but windows high up in the wall are not likely to be very satisfactory. The building is all to be of incombustible materials. Entire liberty is left to architects in regard to style; to have the most possible space for exhibiting the collections is the principal aim, "sans perdre toute-fois le caractère imposant qui convient à un édifice destiné à contenir les trésors antiques de la vieille Egypte." To design a building architecturally worthy of such a purpose, both in the practical and æsthetic sense, is indeed a most interesting task, and one likely to stir up a good deal of emulation in the architectural world; but we may suggest that no one is likely to solve the problem satisfactorily who has not visited the existing museum and made himself acquainted with its contents. The awards, we observe, are to be made by a jury to be appointed by the Egyptian Government. Competitors would probably like to know something of the composition of that jury before they determine to compete. We are glad, however, to see the sensible provision that the designs sent in are to be publicly exhibited *before*, and not after, the awarding of the premiums. As we have often observed, the usual English custom of exhibiting competition designs after the award has been made, goes far to deprive public exhibition of its chief value in eliciting public criticism.

ON the whole we think it is as well that the Accommodation Committee of the House of Commons have reported against the enlargement of the House. It no doubt seems illogical to have a house which has not seats for all its members; but it seems so very doubtful whether any enlargement of the House could be carried out without bringing with it greater disadvantages than an occasional over-crowding, that the interests of the majority of members are best consulted by leaving it as it is. It is at present a convenient chamber to speak in; it would very likely cease to be so after enlargement.

THE forty-first Report of the Department of Science and Art mentions, among much other information, some of the principal purchases made for the South Kensington Museum during the past year. Among these we notice a collection of old English furniture acquired for the sum of 500*l.*; the model of a portion of the Sala del Cambio, at Perugia, completed during the year by the addition of the remainder of the frescoed wall against which the *bancone* (received in 1892) stands; a very large and magnificent Persian carpet, measuring 34 ft. 6 in. by 17 ft. 6 in., bought for the sum of 2,500*l.*; a Limoges enamel triptych, of about the year 1500; a carved ivory group of the Coronation of the Virgin; an Italian chalice enriched with enamels and dated 1365; two German silver-gilt cups and a portion of a girdle in enamelled gold; a leaf of a Limoges enamel triptych painted *en grisaille*, representing part of the subject of St. John the Baptist preaching in the wilderness (120*l.*); the other two leaves had been for many years in the Museum, whilst the third leaf had been the property of M. Spitzer; a beautiful cover of a *textus* or MS. of the Gospels, overlaid with thin gold plaques, and enriched with *cloisonné* enamel-work and precious stones (1,571*l.* 10*s.*; Spitzer Collection); a magnificently-worked English rim-lock, made by Bickford, of London, and bearing the Medici arms

(Spitzer Collection); a boxwood group of the Virgin and Child in the style of Martin Schöngauer (Field Sale); sixteen specimens of Rhodian pottery; a Florentine bronze bowl of the end of the fifteenth century; a valuable collection of early textile fabrics, including stuffs woven at Byzantium, Palermo, and Lucca, as well as a magnificent altar-frontal of Lucca workmanship of the fourteenth century; a large Brussels tapestry worked with subjects from the Court of Love, War, and Religion; and a very representative collection of German ironwork. The opinions of the examiners on the work in various classes of design are given. In regard to Elementary design, Mr. Lewis F. Day comments strongly on the prevalent disregard of instructions; Mr. Walter Crane reports but moderately in regard to the "advanced stage" class of design, the designs for wall-papers and fabrics being characterised as deficient in ornamental inventiveness and technical adaptability; in architecture, Professor Roger Smith reports an improvement in written answers and the explanatory sketches accompanying them, but no such improvement in regard to the delineation of the Classic "orders."

"The examination of the students' work shows that a majority of them have learned the proportions of the orders, according to the painfully minute divisions into modules and minutes originating with older Italian writers and to be found in some text-books. To remember these is an exercise in mental arithmetic, not a study of art. If the student happens to recollect his figures, and make no mistake in applying them, the proportions come out right; but if he happens to have a bad memory for figures, or to make a slip of any sort, he draws a monstrosity; and on this system the eye is not sufficiently trained to enable him to detect that his proportions are wrong, and he finishes up his work without detecting his error. It is very strongly suggested, not that the orders be neglected, for there is no study equal to them for teaching a sense of proportion and the value of it, and a familiarity with refined ornament, but that the Italian arithmetical scheme be proscribed, and that the students learn only with regard to each example the proportions which the main features should bear to the diameter of the column, and no more, and be made to fill in the rest by eye."

In this advice we entirely concur. No doubt the module system does suggest to the mind the study of proportion in architectural detail; but when pushed to a rigid rule for every detail it leads to little more than mechanical drawing instead of design in the true sense.

THE opening of the West Highland Railway on Tuesday last has naturally, at this time of year, caused some public attention to be directed to this new line. But though it may be pleasant for tourists to be able to reach the heart of the West Highlands more easily, the chief valuable results of the railway will be found in the fact that it will enable goods to be more easily distributed in the somewhat inaccessible parts through which it passes. It is likely also to have some noticeable effect on the development of building operations near Glasgow, for it will bring all Loch Long side and the upper part of Loch Lomond within easy reach of Glasgow, so that the merchants of that city will be able to have their country villas in these pleasant positions. Hitherto the lower parts of Loch Lomond have been more accessible to the inhabitants of Glasgow, but it is likely that, with the exception of Balloch, they will be now passed by for the more beautiful and easily-reached upper parts in the neighbourhood of Tarbet.

ACCORDING to Mr. Evan Evans's report to the Local Government Board on an outbreak of enteric fever at Pocklington, Yorkshire, the bad sanitary condition of the district is traced to a combination of unsatisfactory conditions in regard to drainage and water supply, not of the worst type, but sufficient to lead to danger to health. The water supply is by shallow wells in chalk gravel, which are in too near proximity to cesspools in many cases; and though actual contamination has

not been proved, there seems little doubt that it must exist to a certain extent. The drainage is effected by means of culverts and pipe sewers, which discharge at various points into the "beck" within the limits of the town. For none of these have any means of flushing or ventilation been provided, with the exception of a sluice through which water is admitted from the beck to flush a 4-ft. arched brick culvert, which serves to drain Union-street. The majority of the sewers, on account of their defective construction favouring the retention of putrid sewage, and from want of effectual flushing, were found in a very offensive condition. Generally, the house drains are neither trapped nor disconnected from the sewers, and in the interior of dwellings unprovided with yard space there were observed in several instances untrapped sink and soil-pipes. Excrement is disposed of in the better-class dwellings, and occasionally in the smaller cottages, by means of water-closets. These closets, however, are often of an antiquated pattern, with unventilated soil-pipes, and placed in situations favouring the entrance of sewer air into dwellings. For the rest, with the exception of a few pail-closets, the midden privy is in general use; and as in many instances the middens are uncovered, uncemented, and seldom cleansed, their contents become sodden, and soak away into the yards and beneath adjoining buildings. In the majority of the invaded houses insanitary conditions in the form of untrapped and defective house-drains in connexion with unventilated sewers, and large privy middens in proximity to closely aggregated dwellings, were the most prominent features. The recommendations at the close of the report are that advantage should be taken of the sewerage scheme which the Authority have decided to adopt for the town for securing systematic reconstruction of house-drains throughout the place; that midden privies should be replaced, where possible, by water-closets; or else by earth-closets or privies, provided with movable receptacles of limited dimensions; that the Authority should themselves undertake or contract for the frequent and regular removal of house refuse and privy contents; and that the various wells in the town should be periodically examined, and those which are found to be polluted should be closed.

THE last number of the quarterly *Journal of the Sanitary Institute* contains the paper, read by Mr. Isaacs, on "The Construction of Roads and Streets," and the discussion which followed it. This is of considerable interest. The general tendency of the paper and the discussion was to disapprove of wood pavements from a sanitary point of view, and we are convinced that this disapproval is based on good reasons. Some further testimony on this point is added from foreign sources. In the course of the discussion it is suggested that granite paving, in itself both more durable and cheaper than wood or asphalt, might, after all, be the best for large cities, if the law insisted on a noiseless wheel-tyre in place of a noiseless pavement. That would get over a good many difficulties, but, on the other hand, it would probably be found that it was very difficult to get a noiseless tyre that would stand heavy work for long. We notice that in a paper recently read by Mr. James Morgan before the Liverpool Engineering Society, and in the course of the discussion which followed it, there was also a decided tendency of evidence in favour of granite setts and noiseless wheels; and one speaker in the discussion, Mr. Farren, argued that a great deal of the noise on ordinary street pavements proceeded from the vehicles themselves as much as from the nature of the surface they travelled on. This, though true in a sense, is pushing matters a little too far; it will hardly be denied that there is less noise on wood or asphalt than on granite. But it



appears that the consensus of evidence against wood pavement is getting continually stronger.

THE last year's Transactions of the Society of Engineers, edited by Mr. G. A. Pryce Cusson, the secretary, contains many papers on subjects of engineering interest. Mr. W. A. McIntosh Valon, in his inaugural address as President of the Society, deals with such questions of everyday importance as water supply and sanitation. In considering the subject of water-supply to the Metropolis as a whole many important questions present themselves beyond that of the possible future source of supply, and those interested in this subject can derive much information from the paper. The President's remarks on sanitary matters, although necessarily somewhat general, will, nevertheless, be found to form a very good résumé of the latest ideas on the subject. Among other papers that were read before this society during last year, we notice a very good one by Mr. E. G. Mawbey on the Leicester Main Drainage, which is well illustrated, and thoroughly describes these important works that have lately been carried out.

A RECENT Order in Council terminates the jurisdiction of the magistrates for the Tower Liberties, who held their last meeting on June 21, at the Court-house in Wellclose-square. The separate jurisdiction had been set up by a Royal charter granted by King James I., but is henceforth incorporated with that of the Tower division of the County of Middlesex. Northouck records (1773) that the Tower Liberties comprised both the Tower-hills, part of East Smithfield, Rosemary-lane (now Royal Mint-street), Wellclose-square, and the Little Minories; "and in Spitalfields all the streets, lanes, and alleys, built on the old artillery ground belonging to the Tower." In Maitland's work (1756) the boundary is stated with greater precision, and with measurements, though some of the mark-houses he mentions cannot now be readily identified. By his showing, the Liberty encompassing the Tower started from the Water-gate, west of the Tower, passing to the king's mark—the "broad arrow"—at Pike's Corner, then up Petty Wales (in Lower Thames-street), to Pye Corner, at the east end of Tower-street, and so past the "King's Head" to the Brick, anciently called the Mud wall near the entrance into Muscovy-court (Trinity-square), through the City wall "where the king's mark stands upon London Wall," along the Wine-gardens to the old postern-gate, thence northwards to "where the broken Tower stood," and so round by Hog (afterwards Rosemary) lane, the stone house called "Noah's Ark," and since the "Cock," to Irongate Stairs east of the Tower. He adds similar particulars for the Little Minories, Wellclose-square, and Artillery Ground portions, and says the broad arrow had been affixed against every house or building he names, by the king's command. The limits he gives fairly agree with the lines laid down by an Inquest taken in 27 Hen. VIII., and cited by Strype, 1720, which, however, specifies the "Ram's Head" by the Watergate, and calls the Mudwall "Pyke's garden. . . . on this side of Crutched Friars." The corner's inquests were held in the "King's Arms" on Great Tower Hill: a prison was attached to the Court-house in Wellclose-square.

IT appears that Mr. Good, a member of the Bath Town Council, has endeavoured to compel the substitution of plate-glass windows for the sash windows with small panes in the new Municipal Buildings at Bath, on the ground that the latter were "unworthy of the proportion and design of the edifice." The architect (Mr. Brydon) naturally thought that he was the best judge of that, and wrote to the effect that—

"If the Council wish to do their best to destroy both the proportions and the design of a work

which so much thought and care have been bestowed, they cannot do it better than by such a resolution. The woodwork of the windows is as much a part and parcel of their design as the stone work, and if this is taken away and the openings filled with sheets of plate-glass, the windows will be simply reduced to holes in the wall, and the whole tone of the building will be lowered and vulgarized."

This is no doubt true; the building is in the old Bath style, with which plate-glass windows do not harmonise; and we are quite sure that Mr. Good was mistaken in claiming that the "cultivated people of Bath" generally objected to them. His motion found only five supporters. At the same time, as a matter of lighting and convenience, it may be a question whether a design for a public building should not be made so that plate-glass would not spoil it. A public building is not like a private house, and there are some practical reasons why plate-glass is preferable for such buildings.

#### THE BRITISH ARCHEOLOGICAL ASSOCIATION.

THE British Archeological Association began its fifty-first Congress on the 30th ult., at Manchester, on the invitation of the Mayor and Corporation of that city.

At twelve o'clock, a goodly party, consisting of members of the Local Reception Committee, members of the Association, and their friends, assembled in the Sculpture Hall of the Manchester Town Hall, where the Lord Mayor, Sir Anthony Marshall, rendered the members of the Congress a hearty welcome. Mr. Allan Wyon, F.S.A., the Treasurer of the Association, replied, thanking the Lord Mayor and the members of the Corporation for the welcome extended to them, and referring to the signs of material prosperity which were so visible around them, due to the energy and skill of the inhabitants. The fine Central Hall was thrown open for inspection, and Mr. Ford Madox Brown's pictures on the walls, which tell the story of the rise and progress of Manchester from early times, were inspected. These pictures are of varying degrees of excellence, but there was a unanimous opinion expressed with respect to their good decorative appearance as parts of the building, rather than merely as pictures.

A little later in the day, the Cathedral was inspected, under the guidance of the Rev. E. F. Letts, M.A., who, addressing the party in the nave, related the history of the fabric.

Here were two churches, probably side by side, in the same churchyard, of Saxon foundation, at the period when the Domesday Survey was made. One of these passed entirely out of memory; the site of the other was that of the present building, as was evidenced by the discovery of a Norman arch, which was swept away when discovered during one of the recent "restorations" which the building has undergone. The growth of the present fabric, and the addition of the curious chapels which were erected shortly after one another, was pointed out. These chapels are now, to a great extent, visible only as a second aisle on each side of the nave: their divisions and screens having disappeared, as has also the curious Bibby porch, a building of sixteenth-century date, which until recently stood to the south-west of the south aisle. Passing around the fabric, various points of interest were examined and also various small features of variation of style. While traces of fourteenth-century building are visible, the church is a very interesting study of the work of the fifteenth and sixteenth centuries, there being frequent changes of detail, form of arches, &c., in the workmanship of periods but very little removed one from the other. The beautiful stalls, of elaborate oak work on which the Stanley crest occurs, with the singular carvings of the Misereries, were examined. On two of the latter a representation of Lathom House was pointed out. The Derby Chapel, erected in memory of the battle of Flodden-field, the little chapter house, and the Floden Chapel, were all inspected and described.

On the exterior, the south side of the nave which appears on even recent plans with an irregular outline is now made straight and uniform by the destruction of the Bibby porch. The white toned sandstone of the walls is badly affected by the Manchester atmosphere, and the tower, refaced or rebuilt not many years since, is now thoroughly black. Mr. Letts, taking his stand on the exterior, pointed out the old local features. On two sides the site had been bounded by the rivers Irwell and Irk—now the reverse of

clear streams; on the south by a ditch and bank crossed by a bridge over it which is still in existence, but buried by accumulated earth; and on the east by a Saxon stockade. These enclosed a space which once had the right of sanctuary. Under Mr. Letts's guidance, the members then proceeded to Cheetham College. This out-of-the-world building, so unlike the Manchester of today, is formed out of the houses erected for the Canons, when the parish church became collegiate, on the site of the ancient Baron's Hall, or Manor House. It is a stone-built structure with massive timberings of oak, the appearance of which go far to support a curious theory which Mr. Letts put forth—that the roofs and floors are older than the walling. In fact, that the original college was a timber building, the exterior of which has been rebuilt in stone. The roofs are particularly fine, in admirable preservation, and it is possible that a portion of the ancient baron's hall may still exist in the present structure. On assembling within the open-roofed hall on the ground floor, the Dean of Manchester welcomed the party to the building, all of which he announced was then open for inspection, notwithstanding that on the day, being the founder's day, the rooms had just been used for the annual meeting of the trustees of Cheetham's foundation. The members then proceeded to examine the various rooms and the ample library, perhaps the earliest example of a public library in existence. The audit-room has a fine flat roof with curious bosses, counterparts of some in the Cathedral. One of these, representing a huge head with a child in its mouth, relates to a local giant "formerly supposed to live in a castle formed from the ruins of Roman Manchester, and who devoured a child every morning." The subject appears also in the Cathedral. The panelling of the room is of Cheetham's time, and elsewhere curious items of detail of the same period were met with. The beautiful stone cloister was surveyed, and a passage and steps leading down to the river (now of unsavoury odour, much below the level of the present building, was traced to what was once the water entrance.

In the council room, on the first floor, some admirable pieces of oak panelling and a fine arched roof were pointed out. Here are many ancient portraits, including John Bradford the martyr, Dr. Deacon, the last of the Non-juring bishops, and many others are also preserved; and elsewhere is the original Deed of Gift of the building, temp. Edward VI., to the Earl of Derby, a capital specimen of writing on parchment, admirably illuminated.

There are many memorials of Cheetham, and, indeed, the presence of the boys of the Foundation, and the books in the library, attest to the vitality of the institution at the present day, after so many years of usefulness.

Close to the church formerly existed the bull-baiting tree, and within 200 yards from the fabric were also the cock-pit and the spot set apart for bear-baiting.

The spot must have been once one of much natural beauty, and the group of the Cathedral, the ancient buildings of the college, and the old bridge over the Irwell, joining Manchester to Salford on the opposite side, must have been remarkable. Now all charms of scenery have disappeared, the river is of ink-like colour, and the rattle and roar of traffic to the two huge railway stations adjacent indicate the great change from the past to the present.

Roman Mancunium stood away from the site of the present cathedral, the position having been determined by the discoveries of recent years, and a fragment of the ancient wall surrounding the settlement, was laid bare not long since, and is preserved beneath a railway arch. In Saxon times, the town appears to have been outside the old Roman walls, more or less, around the Cathedral. There is, however, every reason to believe that a Roman summer camp formerly occupied on the site afterwards occupied by the Barons' Hall, at the junction of the two rivers, a spot that must have been one of natural strength, although it was not a little difficult to realise that it once had high cliff-like banks above the water level, now that the height of the adjoining railways is so considerably above the present ground, and lofty buildings rise in every direction.

In the evening the Lord Mayor and Lady Mayoress received the members of the Congress at the Town Hall, and nearly a thousand persons were present. During the interlude between agreeable music of various kinds, the old deeds and documents belonging to the Corporation were laid out for exhibition, and they were described by Mr. J. P. Earwaker, M.A., who afterwards



read a short descriptive paper. They have come into the possession of the Municipal Authorities owing to the purchase of the manorial rights, and they relate for the most part to the records of the manor and its ownership by various lords. The enormous growth and development of the city are brought vividly before the imagination by perusal of the documents which describe as fields, let at very modest rents, what are now centres of enormous industries teeming with populations that can be counted by the thousand.

On Tuesday, the 31st, a visit was paid to Chester. On arrival, the members were met at the railway-station by Alderman Chas. Brown, Deputy Mayor, and by several members of the Chester Archeological Society; and under their guidance progress was made to St. John's Chapel. This fine building, partly in ruins, partly restored in weak-looking smooth stone, has but a poor exterior, but the interior has a grand effect, with its sturdy Norman arches of the nave, and its fine clearestory and triforium. The south-western tower, which fell in 1881, has not been rebuilt, and it seems to be strange that no effort is being made to accomplish so desirable an undertaking. Indeed, the work is actually retarded by the erection of a poor cage for bells at the east end to admit of bells being rung. Chester appears to be content with the loss of its most lofty church tower and one of its principal ornaments. The ruins are cared for, and many interesting carved stones have found a fitting resting-place in the dismantled Chapter House, which, fortunately, still retains its vaulted roof. Here are the heads of several Saxon crosses, mostly in good preservation, adorned with knotwork and bosses. Passing along the walls overlooking the windings of the Dee, and the ancient bridge of approach to the south, a visit was paid to St. Mary's Church, recently restored in a very careful manner. Afterwards the Grosvenor Museum was inspected. Here are the celebrated Roman sculptures obtained from the ancient walls of the city, where they had been used in some late Roman time as old material. The belief that they were of early Roman date, which had been expressed since their discovery, has now undergone the test of the careful examination of the monuments themselves. These are for the most part sepulchral, and they indicate their erection at an early period of the Roman occupation of the district. An interesting description of the remains was given, and the various articles were pointed out which had been found at Chester in previous years, as well as the recent collection of the remains from the city walls. Here are now stored together, in a room all too small, the most extensive collection of Roman sculptures, found in one spot, that England has to show. Here are altars, friezes, inscriptions, pediments, sepulchral tablets, and a vast number of architectural members, it being possible to bring into the room only the principal objects for exhibition. Among the mass of relics of interest pointed out were the altar dedicated by Hermogenes with Greek lettering, one of the few examples of Greek inscription found in Britain; the tomb of the standard-bearer, found in the city walls; the altar to the Goddess Mothers; the tomb of Cesonia Severiana; and, especially, the so-called "ecclesiastical" stone which was so frequently referred to when the age of the sculpture was under discussion. It is now acknowledged that the figures in unusual costume are of Roman date, and the stone is carefully preserved from injury under glass. In addition, the inscriptions convey a large amount of information with respect to the habits and manners of the Roman colony of Chester, from the years 72 A.D. to 85, the garrison then consisting of two legions. Many of the soldiers named by the inscriptions appear to have been but young men, and to have been of various nationalities. The sculptures are of poor execution generally, and the execution conveys the idea that they are hardly the work of skilled artists. Nevertheless, they are designed with a certain amount of artistic taste, and they are valuable evidences of the art of Roman times. The architectural fragments show no sign of having been built up with mortared joints. The members then proceeded through the curious wooden "rows" for which Chester is so famous, and so unlike any other city in England to the Town Hall. Here a sumptuous luncheon was prepared for them, and to which they were invited by Mr. Alderman Brown. Mr. Wyon proposed a vote of thanks to Mr. Brown prior to the departure of the guests, and referred to the fact that Mr. Brown has been Mayor of Chester for the remarkable number of six times.

Chester Cathedral was then inspected under the guidance of the Ven. Archdeacon Barber. The platforms and galleries used for the Musical Festival held last week were in course of demo-

lition, and the proportions of the west end were hidden by the mass of scaffolding. After inspecting the fine series of marble mosaic pictures which now cover the north aisle wall, the party passed through the north transept into the choir. Thence to the large south transept, where the archdeacon pointed out the positions of the screens which formerly divided the eastern side into various chapels, although the transept had actually been used as one of the parish churches of the city, to which the parishioners had been successful in maintaining their rights after much litigation with the monks. The party found ample evidences of the careful manner in which the works of restoration were carried out by Sir Gilbert Scott. Not only are the bases of the Norman piers of the choir preserved, and spaces left in the modern pavement for their inspection, but the outline of the Norman apsidal east end is indicated by marble lines laid in the present pavement. In the north transept, also, traces of two later works of addition to the ancient Norman walls have been left for observation in very gratifying manner. The chapter house, damaged by a recent storm is now cleared of its presses and books temporarily. After inspecting it, the refectory and the fine vaulted crypt to the north-west of the cathedral were visited. The latter has only recently been cleared out and rendered fit for inspection, after some few works of repair to the vaulting had been executed. It is, perhaps, one of the best examples of very Early Norman vaulting now remaining. Archdeacon Barber's interesting description well merited the cordial thanks that were rendered to him when the cathedral was left.

The north portion of the city walls was then visited. It is from this part of the wall that the bulk of the sculptures in the Grosvenor Museum were obtained, the discovery having been made during a repair of the wall. It was then found that much of the walling was composed of the sculptured stones in question, which had been re-used as old material at a time later in the Roman occupation, when the present walls were built. Much care was used to extract the sculptures, care having been taken to search for them from the back, where the masonry is covered by an earthen bank, and none of the face of the wall was disturbed. The wall had been buried for nearly half its height on the exterior by accumulated earth, but the visitors found that the whole of this had been removed, and the face of the wall was visible from its rock base up to the parapet. This important work was effected by Alderman Brown during one of his years of office as Mayor. The wall is constructed of massive blocks of red sandstone, closely jointed, and put together without mortar. This fine example of Roman masonry is now visible from the north-east tower quite up to Northgate; and beyond this, to the west, its foundations may be not only traced, but the wall itself exists to a considerable height, the existing city wall, of Medieval date, being built somewhat to the south, the ancient masonry acting as a retaining wall to it. Here are several Roman sculptures in mutilated condition, for which there was no room in the museum. The Roman work doubtless exists beyond the point excavated.

After the return to Chester, an evening meeting was held in the History Theatre of Owens College, which was placed at the disposal of the Congress for the purpose. The chair was occupied by Mr. Allan Wyon. The first paper was by Lieut.-Colonel Fishwick, on the pre-Norman Churches of Lancashire. These were probably only of timber in very early times, but there were historical indications of the existence of a fairly large number of such structures, regard being made for the sparse population of the county, where so much of its area was either moorland or forest. The number, however, about twenty-seven, is very small in relation to the present population. Saxon masonry only appears to exist at Heysham. Mr. Loftus Brock, F.S.A., pointed out that the existence of many Saxon sculptures of interlaced work indicated that works of masonry could have been executed, and the presence of such sculptures is likely to refer to the existence of churches on the spots where they have been found. The second paper was on the Roman roads around Manchester, by the Rev. Dr. Hooppell, who traced the course of many of the principal roads, and made suggestions with respect to the sites of several stations which are unknown. A third paper on the Visitations of the Plague in Lancashire and Cheshire, by Mr. W. E. A. Axon, terminated the proceedings. These visitations were very numerous and destructive, and the records of the various townships testify to this by

many painful details. In some cases whole families were swept away by the pestilence.

On Wednesday, August 1, the members had to encounter a steady downpour of rain. Notwithstanding, a large number proceeded *via* Bolton and Blackburn to Whalley, passing through a country once but sparsely populated, but now teeming with cotton-mills, factories, and the houses of the operatives, the landscape being obscured by the clouds of smoke from the tall chimneys of the various works, indicating that work and prosperity were in active progress.

On arriving at Whalley, carriages were in attendance, and the party proceeded to Little Mytton Hall, where the Rev. J. S. Doxey rendered a description of the building. While the exterior has been modernised, the great hall still remains in perfect condition. It is a fine example of ancient timbered work of the end of the fifteenth century. The roof is carried by well-proportioned four-centred arches, and the minstrels' gallery and its screen have some excellent detail, the screen having some interesting medallion portraits and open panelling, probably brought from another hall, now demolished. The adjoining church was then inspected under Mr. Doxey's guidance. The building is a good example of a small Lancashire church, curious for having a descent from the west into the chancel. There is a good screen, a low side window to the chancel still retaining an oak shutter opening inwards, an Elizabethan font-cover of oak with curious carving in low relief, and a parish library of a few chained books. The principal interest centres, however, in the Shireburn Chapel, where six generations of that ancient family, formerly of Stonyhurst, are interred. The building was erected in 1594, and is a curious specimen of Elizabethan churchwork. The windows have tracery without foils or cusps, and the arches and oak screen dividing the chapel from the church are interesting examples of the same date.

After luncheon at Whalley, the party proceeded to the parish church, the mother church of a large district. It is a plain building, and although of very early foundation, the oldest existing portion of the structure is the chancel, which is of early thirteenth-century date. Mr. Doxey again acted as cicerone, and after describing the early history and many features of interest, he called attention to the oak stalls, which, with their open canopies, are of great beauty. They were originally made for the adjoining abbey and were removed here at the dissolution. In the churchyard still exist three crosses of pre-Norman date, covered with elaborate knot-work and interlaced patterns; while there are broken remains of some others, and in the walling of the chancel are portions of work of the same date used in Medieval times as old material. The Nowell pew, of carved oak, very like an old four-poster bedstead, still exists on the south side of the nave, and Mr. Doxey related the story of its existence and of the costly lawsuit which it gave rise to. The churches of the locality present several examples of the existence of privileged pews and of their discordant appearance.

Progress was then made to the remains of the celebrated Whalley Abbey, in close proximity to the parish church, now partially incorporated into a substantial old dwelling-house, which has been recently restored. The site of the church, cloisters, and refectory is, however, away from the mansion, which is built on to what was the Abbot's house. The abbey was described by Mr. Loftus Brock. Taking his stand on the site of the cloister court, he referred to the fact that the Abbey having originally stood on another site, the consecration of the buildings erected here in 1306 indicated that their plan would be one of the latest Cistercian foundations in England, and it would be of interest to compare it with earlier ones. While the general arrangements were the same, there were many points of difference. Thus, the Refectory, always placed north and south in the early abbeys, had been here east and west. Its site and one wall alone remain. The western range of buildings, the so-called *Donus Conversorum*, the walls of which still remain in perfect condition, had no entrance on the north end into the church, but the approach is by a staircase still remaining at the south. The Day-room has its south end filled with a window once glazed. The Chapter House has been beyond the door of approach to it, and although nothing but its vestibule (often taken to be the actual Chapter House) remains, yet the toothings for the walls are visible on the east side. The position of the Conventual Church, which must have been of large size, was pointed out, and a few portions of the west front, the south side, and the end of the south transept,



enable this to be determined with accuracy. The position of the stairs up to the dormitory from the cloisters is very visible. In the Abbot's House are two huge fireplaces which bear witness to the large consumption of food stated in the ancient documents. There are evidences that the progress of the buildings was slow after the date of consecration, and that only a portion could then have been erected. Licence to crenellate was obtained in 1349, and the commencement of the two fine gateways date from that time. On one of these the existence of the letter E has been perplexing, but it was pointed out that this and some other signs were masons' marks. Before leaving, a capital model of the Abbey as it was supposed to have appeared before the Dissolution, prepared by Mr. Doxey, was exhibited by him in one of the out-buildings of the mansion. Mr. de Gray Birch, F.S.A., also read a paper entitled "Some Historical Notes on Whalley Abbey." It had reference to some of the existing manuscripts in the British Museum relating to the Abbey, and of the transfer of the site from Stanlaw to the present one. The abbey ruins stand beside the River Calder in a beautiful valley bounded by hills, the town of Clitheroe and its ancient castle being visible in one direction, and the buildings of Stonyhurst College in another. In the evening a meeting was again held at Owen's College, the Rev. E. F. Letts being in the chair. Mr. Allan Wyon rendered a description of the great seals of England. The lecture was illustrated by lime-light pictures of the different varieties of seals used from the time of Edward the Confessor to the present reign, those of Edward III., Henry IV., Philip and Mary, Elizabeth, and Queen Anne being particularly dwelt upon, either for their artistic beauty or for the important political changes which took place. There was a large attendance.

Thursday, August 2, was again a very wet day, but fortunately for the party the rain ceased at mid-day, but the steady downpour made the attendance small, and the morning's work was done under difficulty. The programme included a visit to Macclesfield, where the church was the first object of interest. It was described by Mr. J. P. Earwaker, F.S.A. It consists of a large heavy nave in the poor style of the last century, once surrounded with galleries now removed, owing to an attack of dry-rot, and their removal (all but the cross principals) has given the building a singularly bald appearance, the galleries having been an essential part of the design.

The ancient tower remains, shorn of its spire, which was blown down in the last century, and the many coats-of-arms introduced into its design appear to be those of contributors to its erection. Mr. Earwaker having led the party into the Savage Chapel, another ancient portion of the fabric which fortunately remains, he proceeded to describe the building and the remarkably fine series of monuments which it contains. The chapel was built by Thos. Savage, Archbishop of York, between the years 1501-1507. It consists of two stories above the chapel, the upper ones having been used as the residence of the Chantry priest. Over the entrance doorway is a projecting oriel, and the doorway bears the arms of the Sees of London and Rochester, as well as of York, showing that Archbishop Savage had previously been bishop at each of these places. He left his heart for burial in the chapel. The monuments consist of very fine recumbent figures of the Savage family, and among many others there are those of Sir J. Savage, Kt., *ob.* 1495, and Catherine, his wife, sister to the first Earl of Derby; a second Sir J. Savage, killed at the siege of Boulogne in 1492; a third Sir J. Savage, *ob.* 1527, and a fourth of the same name, who died 1528, and whose effigy, with that of Lady Elizabeth, his wife, lies beneath an ornamental arch.

There is preserved in the chapel part of the celebrated "pardon" brass, offering many centuries of remission from the pains of purgatory, once the resort of many pilgrims. Elsewhere are memorials of the Leigh family, and their chantry chapel. The monuments and the various ancient parts of the church are in poor condition, and the appearance of the effigies would be greatly improved by a little judicious cleaning.

The church, originally dedicated to All Souls, was erected by Queen Eleanor of Castile, but it is now called after St. Michael, the time when the change occurred not being known. The storm prevented any examination of the exterior, and the adjournment to the Town-hall was a pleasant part of the programme. Here the Mayor rendered welcome to the party, and the Town-clerk proceeded to describe the numerous

charters and other old documents belonging to the Corporation. Some of these have seals of much interest. The mace, a fine example of design and workmanship, was exhibited, and, among many other objects, the scold's bridle. The welcome shelter of the Town-hall was left with regret, and the party drove off through the storm to the fine church at Gawsorth. Mr. Earwaker described the building, which is of Late Perpendicular work, having a wide nave without any side aisles, and a chancel of the same width, of slightly later date, opening into it without a chancel arch. The roofs are of low pitch, of ornamental oak panelling. The walls now show the stone-work of their construction, but they were formerly covered with wall-paintings. Mr. Earwaker exhibited drawings of the various subjects, which included a huge figure of St. Christopher. Elsewhere was St. George; and on one side of the east window was the Last Judgment: one of the lost was represented descending into the lower regions in a wheelbarrow.

The figures and the execution appear to have been alike poor and bald, and the loss of the paintings is hardly to be deplored. Here is a good octagonal font, but the principal objects of interest are the very beautiful effigies of the Fitton family. They are in fairly good preservation, and present, like those seen at Macclesfield, many interesting and curious details of costume and armour. An inscription states that the family are Fittons to wear a heavenly diadem. Time did not permit of the inspection of the ancient rectory-house on the opposite side of the road, to which the members were invited. The exterior presents an admirable appearance. It is built of timber filled in with white plaster, after the custom of the district.

The curious chapel at Marton was then visited, and the rain having ceased, the building was inspected with comfort, while the effect of the clearing away of the storm and the gleams of sunlight on the distant hills of Derbyshire was very enjoyable.

The building is formed entirely of timber and plaster on a low stone base a few inches only in height, with some comparatively modern additions to the chancel in brick. It consists of a nave and aisles, a shingled spire at the west end, surrounded by an ambulatory. The windows are in fourteenth-century style, but they have been renewed in Mr. Butterfield's recent restoration; but they are apparently copies of the previous ones; the mouldings of the doorways, which are ancient, are of the same period. The main timbers are still firm and sound, although the want of tie in the original construction has caused a good deal of twisting, and of extra supports to prevent it. The appearance of the fabric is very curious and unusual, although its church-like aspect is apparent. Stowed away among disused articles in the ambulatory is a large early effigy of a knight, which, although worn and defaced, deserves to be placed in a better position. It is of early date.

Marton Hall, a fine example of black and white work, was passed *en route* for Congleton, at which latter place the next halt was made. The town still possesses several curious ancient houses in the local style, of which the Lion and Swan Hotel is a good example. After welcome at the town-hall, the various charters, &c., were inspected, and the town clerk explained them in very lucid manner. Here is an interesting mace made during the time of the Commonwealth; a Scold's Bridle which was actually used in 1824, probably the latest instance of such use in England. A woman, a native of the town, had been abusive to the churchwardens on a Sunday, and the punishment was inflicted in consequence. A set of St. Peter's bells mounted on a broad strap were also shown. They were formerly worn by an acolyte, who on passing through the streets, would by the loud jingling of the bells give notice of certain church services. They were afterwards put to other uses. The town clerk explained how the inhabitants had obtained their nickname of "Congleton Bears." The church bible having become worn out, was sold, and the proceeds were applied to the purchase of a bear for the town, the old one having unfortunately died at the time. The next halt was made at Astbury Church, a building of large extent and of very irregular plan. There is a wide nave, 9 ft. 7 in. wider at the west than at the east, the chancel and the side aisles being continuous. A lofty spire of stone on a shorter tower is attached to the north side of the north aisle level with the west front. It is not used as a porch, but a porch is built beside it. In the centre of the west front is a square

projection of three stories in height, looking like an intended tower, probably used by one of the chantry priests. Within, the roofs are ancient, of oak panelling with two curious pendants, and there is a very fine rood-screen in capital preservation. Mr. Wm. Pullinger described the fabric, which he justly described as being one of the finest churches in Cheshire. Traces of Early English and of fourteenth-century work are observable, but the main bulk of the fabric is of Perpendicular work; the east window is known to have been erected in 1493. Mr. Pullinger pointed out a singular discrepancy in the panelling of the north aisle, where some of the angels which act as wall-pieces are placed without any regard to the arches of the nave; and they do not abut upon anything, the unworked backs showing in the arch spaces.

The church is full of interesting details for the antiquary and the architect, and the greatest number of these were pointed out. Here is a curious low side-window; a good font with a Jacobean cover, which is raised by means of a singular wall-slide and bracket of oak; a fine altar-tomb with the effigy of a lady, a member of the Grosvenor family; a late pulpit and lectern, various brasses, and lastly a capital of Saxon interlaced work, found not long since doing duty for the support of a beam. The entrance to the churchyard is by a fine gateway and arch surmounted by battlements and pinnacles, erected as a memorial to Thos. Dod, D.D., formerly a rector of the church. The date given on the inscription is 1542, but Mr. Pullinger has shown that this is a mistake, since he died in 1647-8. The church is an admirable subject for sketching, and we commend it as an interesting object of study to the architectural student, who will find the district full of subjects for his pencil and note-book. The party then proceeded to inspect the celebrated example of half-timbered construction, in black and white work—Little Moreton Hall. It is needless to notice a building so well known at length. Mr. Earwaker took his position in the courtyard, and rendered a description of the fabric, after which the members proceeded to explore the building from end to end. The glazing of the windows has recently been renewed in old-looking patterns, and a few works of repair to keep the building weather-tight have been effected, but hardly anything more, except to renew the black coating to the external wood-work, and whitewash to the plaster filling in. The front building, over the entrance gateway, and its upper galleried story, still remain unaltered, and therefore the mode of construction and the plastering between the timbers is readily studied. Here is the curious chimney-piece with the quaint figure bearing aloft a globe with the motto, "The spear of Destiny whose ruler is knowledge"; and elsewhere, on the exterior of one of the bay windows of the Hall, the inscription setting forth that "Rycharde Dale Carpenter made this window by the grace of God 1559" is now clearly legible by the new coating of white on the black ground. The drawing-room, with its curious chimney-piece; the hall, with its bay windows; and the little chapel, with its screen, were all carefully inspected, and this most interesting of the Cheshire Halls was finally left with regret. In the evening another public meeting was held at Owen's College, when, on the chair being taken by Lieut.-Colonel Fishwick, various papers were read.

The first was by the Rev. J. H. Stanning, M.A., who took for his subject "Some aspects of the Great Civil War in Lancashire." The paper indicated how heavily the war bore on the people, and how estates were sequestered. The misdoings of Peter Ambrose, sequestration agent, formed the principal part of the lecture, and justified the epigram that "public plunder led to private privation." The "Oldham key," by Mr. Samuel Andrew, was the second paper, in which the lecturer, by an ingenious process, essayed to unlock the ancient history of his district by a series of comparisons. These comparisons he compared to the wards of a master-key, and the relics of primeval times existing at Oldham are found to have their counterparts in other townships. This was followed by a short paper on "Shoe Lore," by Mr. H. Syer Cuming, F.S.A., read by Mr. Loftus Brock, in the author's absence; and the proceedings were brought to a close by a paper on "The Early Occupants in the vicinity of the Mersey, Morecambe Bay, and Manchester," by Dr. J. S. Phené, F.S.A. The lecturer said but little of these early occupants of the districts named, but a great deal generally of the relations of ancient Britain with Italy in pre-Roman times. He identified the early roads of



both countries as being identical in construction, and concluded therefore that the intercourse was for trade purposes. The great roads called Roman are, in reality, on the site of ancient British ones. The roads, the customs, and the manufactures of early times may be traced from Britain, across Scandinavia, into Italy.

On Friday, August 3—another wet morning, the members and their friends proceeded to Nantwich, where various houses of black and white were inspected. These date from the burning of the town in the time of Queen Elizabeth, and on one of them is an inscription in commemoration of the event, and of the Queen's bounty in relieving the sufferers. The fine Cruciform church was then inspected under the guidance of the Rev. J. W. Norwood, M.A., who, after describing the exterior, let the party into the interior. The church is of the fourteenth century, some portions being later than others, and the south transept is of early fifteenth-century work. The clearstory of the nave, however, is of still later date, having taken the place of an earlier roof of high pitch, about 150 years after its erection. The well-known octagonal tower at the crossing is of great beauty, and the tracery patterns of the windows of the church are of varying design and effect.

The choir stalls are in admirable preservation. Here is an ancient stone pulpit, and many features of peculiar construction, among which may be noted the stone ribs across the aisles which act as internal flying buttresses. The west front is a restoration by Sir Gilbert Scott, wherein he has introduced, as stated by Mr. Norwood, a central window and a doorway out of style with the flowing Decorated work of the church. The next building inspected was Dorfold Hall. Here the party was welcomed by Mr. C. S. Roundell, M.P., who conducted the members over the mansion. It is built of red brick, with patterns of black, the dressings and quoins being of local sandstone. An inscription commemorates that it was built A.D. 1616, and elsewhere the date 1621 appears. There is some good panelling, but the arched ceiling of the drawing-room on the first floor is a magnificent example of plaster decoration. The pattern is very intricate, and there are many pendants. The walls are panelled, and two recesses make the plan to be in the shape of the letter T; the ceiling and the panelling extending into the recesses. The flower-garden in the rear is laid out in beds of quaint form, and here are preserved two old fountains, one of the middle of the seventeenth century, the other of either Saxon or Early Norman date. It is surrounded by semi-circular arches, enclosing rude sculptures, and it stands on a modern base. Nothing is known with respect to where these fountains came from, except that one came from a neighbouring vicarage, and another from a farmyard. To the right of the house is a curious garden decoration of arches and niches, in which are the busts of James I. and his queen. The house is singularly like Crewe Hall before the fire, and probably the work of the same architect. After thanking Mr. Roundell the party proceeded to Acton church, where Mr. Norwood and Mr. James Hall acted as guides. The church has a large tower at the west end, the aisles coming up to the front, the tower opening into them by wide arches, the date being that of the end of the twelfth century.

The clearstory is no older than the middle of the last century, the tower having been blown down upon it by a severe storm. The east end has a curious parapet of Elizabethan or Jacobean work, and the chancel has some good panelling and other oak work of the same date. At the end of the south aisle is a very fine monument, a feature which is common in the churches of the locality. Close to it, built up as old material in the wall of the aisle, are several fragments of probably a pre-Norman cross-shaft. Bunbury Church was then visited and described. It is a fine building with a lofty pinnacled tower, and with good specimens of fourteenth and fifteenth century architecture. The south chapel, now in the hands of builders for restoration, has been deprived of its roof. Here, among the stones removed from the foundations, some member of the party was fortunate enough to detect many stones of a fine Norman doorway, which it is to be hoped will be preserved. Carriages being resumed, the return journey was made from the Beeston Castle Station, the visitors being enabled to see the remains of the old fortification on its conical hill from a distance. In the evening a conversazione was given by the Mayor of Salford, Sir W. H. Bailey and Lady Bailey, in the Peel Park Museum.

The visitors having been received in the library, proceeded to inspect the paintings on loan in the art galleries, which were specially lighted up for the occasion. Various bands of music were in attendance, and in the Central Hall, Mr. Alderman Makinson, Chairman of the Museum Committee, gave an interesting description of a volume of the Borough Reeve's Court of Salford, which has recently been discovered, having been purchased with other things at an auction. It contains the records of the court from 1597 to 1669. A great number of names of inhabitants occur in it, and it is matter of curiosity to record that all of them are still known in Salford. Thanks were rendered to all who had helped in bringing the Congress to its successful issue, particularly the local secretaries, Messrs. Holme, Nicholson, and Yates, and the local committee. The party spent the remainder of the evening in the examination of the various works of art contained in the galleries.

The Congress was brought to a close on Saturday, August 4, when the members in reduced numbers proceeded, *via* Rochdale, to Littleborough, whence, under the guidance of Dr. H. Colley March, F.S.A., they proceeded by carriages to inspect the Roman road on Blackstone Edge. A short drive from the railway station brought them into a district very unlike any other scenery that had been passed through during the Congress. Barren moorland, rising to a considerable height, extends in every direction, and the hills shut out from view the tall chimneys of the busy districts around Rochdale and Littleborough. But the smoke of these regions cannot be lost to sight so easily.

The formation is of millstone, grit, and sandstone, and the dark hue of the material and of the clouds gave the landscape a very sombre aspect. The carriages were left at the modern roadway, and the party proceeded across the moors in quest of the Roman road. Here, partially overgrown with peat and vegetation, is one of the most remarkable portions of a Roman military way in the kingdom. It takes the slope of the hill and rises, according to Dr. March, at a gradient equal, in the entire length, to a rise of 1 in 4½, "which is steeper than the Rigi Railway. Hence, when wagons were used on this road, skidding was imperative." It rises to a height of more than 200 ft. above the level of the modern roads. Its course is not serpentine, but slightly zigzag, as if the points had been first marked out and then the road made straight between them. It is built on a foundation of rubble, and drained by lateral fosses, its cross section being arched so as to throw rain-water away from the centre on each side. It is paved with hard local ashlar stones set on edge, and in the centre of the roadway is its greatest peculiarity, for here is laid a course of massive blocks fitted together with considerable precision. They are hollowed out by a longitudinal furrow or trough, 17 in. wide on top and 12½ in. at the bottom, the depth being a maximum of 6 in. and an average of 4 in. These stones are of large size, many of them measuring 3 ft. 6 in. in length by 2 ft. in width. The road is bounded by well-defined curb-stones, the width being 16 ft. The stones are rounded and worn by traffic, and here and there the markings of wheel ruts are very distinct in the pitching. The skidding must have taken place in the central furrow, and although there are no track marks, there is ample evidence of planing action throughout. The road extends quite up to the top of the hill, where a stone indicates the boundary line between Yorkshire and Lancashire, and on the opposite side of the hill the gradient is less steep, and the ancient roadway is not so well defined. As the top of the hill is reached, it is to be noted that much of the surface has been cut away to lessen the gradient, and the road in consequence proceeds in the cutting below the original surface of the ground. An extensive prospect over barren moorland and hills rewards the traveller for the labour of the ascent. The road extended from Roman Manchester, and joined the road from Ribchester to Ilkley. Nothing remains of its track from Blackstone Edge to Manchester, but its course may be traced by the various place-names which still exist.

On returning to Littleborough, Dr. March was warmly thanked for conducting the party; and the Congress came to an end on their return to Manchester, where the members separated.

Thanks to the officials of Owen's College, many opportunities were given to the members of the Congress to inspect the treasures of early times that have been collected within its walls. Here are implements formed by Palæolithic man from various parts of Great Britain, France, Palestine,

and Egypt. Specimens from the Cresswell and Windy Knoll Caves, Derbyshire, shell from the raised beaches and "Kitchen middens" of Sweden. Of neolithic remains, are various polished implements, and the "Thompson" collection of objects from Switzerland. Of the Bronze Age are many specimens from Great Britain, Scandinavia, Switzerland, and Greece, including a collection of stone implements used in copper-mining at Alderley Edge. While in the historic room are not only objects from Egypt, Cyprus, the "Moss" collection of objects from Troy, but the canoe found in making the Manchester Ship Canal, hollowed out of a single log, Romano-British remains, and the "Finlay" collection of engraved gems from Greece.

#### MAGAZINES AND REVIEWS.\*

IN the *Art Journal* a subject rather off the beaten track is treated by Mr. Clarence Rook, "The Castles of the Channel Islands," with a number of interesting little sketches by Mr. J. Ayton Symington. The frontispiece and first article are devoted to that considerably overrated painter Mr. Maurice Greiffenhagen, who seems to us to unite an original invention and perception in colour with a certain vulgarity of artistic conception.

To the *Magazine of Art* Mr. Reginald Blomfield contributes an article, partly illustrated by his own sketches, on "New Scotland Yard," Mr. Norman Shaw's building so called, which was the object of some ridiculous questionings in the House of Commons at the time of its completion, when it was made a vehicle for a political attack; the only sense in which architecture ever gets into the House of Commons. In much of Mr. Blomfield's enthusiastic article we agree, but we fear we still find the assemblage of objects on the roof somewhat more curious than architectural. The best bit of detail illustrated is the simple but broadly designed mantelpiece in one of the interiors. "A Dissertation on Foreign Bells," by Mr. Shaw-Sparrow, promises rather more of interest than it quite fulfils, but it contains some information on out-of-the-way bells in various places.

In the *Studio* we found an "interview" with Mr. William Morris, by Mr. Aymer Vallance, on the subject of the revival of tapestry-weaving, concluding with the report of Mr. Morris's contemptuous remarks on the museum of classical sculpture which has been turned out of its gallery at South Kensington to make room for specimens of ancient tapestry, intimating that there can be no doubt which is most for the benefit of the nation "beautiful tapestries or classical gods and goddesses." That is to say, that the study of antique sculpture and its forms and development is, in Mr. Morris's mind, a subject of inferior interest to Medieval tapestry. We can only say that we are sorry for Mr. Morris. Mr. Herbert Marshall writes a second letter about London (in the series of "Letters from Artists to Artists"), accompanied by some excellent sketches of London scenery.

The *Architectural Review* (Boston), No. 8 of Vol. II., contains the address of the President (Mr. R. D. Andrews) of the Boston Architectural Club; a short address with some fine thoughts in it; and an article by Mr. Howard Walker on "The Attitude of the Architect and the Public," which is mainly an argument in favour of a trained and certified architectural profession. The illustrations include a larger proportion than usual of designs of modern executed architecture, of which the most interesting is a geometrical drawing in line of the details of the Albright Memorial Library at Scranton (Messrs. Green & Wicks, architects), which show some interesting novelty in the treatment of details based on Late Gothic.

The *Architectural Record* (New York) gives its readers, as a frontispiece, a chromolithograph view of the Roman Forum. The number includes No. IV. of "Architects' Houses" (houses designed by architects, that is), with a number of interesting illustrations; and the first of what seems likely to be an excellent series of articles on "Architecture in Spain" by Mr. Chas. A. Rich. Mr. Goodyear contributes a largely illustrated article on "The Origin of the Acanthus Motive and Egg and Dart Moulding," as he calls it: "moulding" is not the right word; an odd mistake to see in an architectural periodical,

\* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.



unless the Americans are adopting the word "moulding" in a different sense from our use of it. Mr. Goodyear bases his theory of the Anthemion on his previous one that it was the origin of and identical with the Ionic scroll, a conclusion we think very doubtful.

The *Nineteenth Century* contains an interesting and suggestive article by Mr. Mahaffy on "The Present Position of Egyptology," taken up mainly with the idea, originally suggested by Champollion, but quickened by recent discoveries, that Coptic is the high road to old Egyptian speech. The fact that some recent discoveries have given a new impulse to the study of ancient Egypt makes it, of course, all the more important that we should not have the bulk of the architectural memoranda swept away from us by engineers. To the same number Mr. J. S. Jeans contributes an article on "The Labour War in the United States"; and Mr. W. Roberts, under the heading "Some Pictures and their Prices," gives some curious information as to fluctuations in the market price of the pictures of various masters, ancient and modern.

In the *Century* we have an article on "the Coleman collection of antique glass," by Mr. Russel Sturgis, with a number of illustrations of interesting bits of ancient glass. "Washington as a Spectacle," by Mr. Marion Crawford, is interesting, and exceedingly well illustrated by Mr. A. Castaigne. Mr. Timothy Cole writes the article this month on "Old Dutch Masters," which consists of a brief note on Quinten Massys, with an illustration.

In the *Fortnightly Review* Mr. Colden Sanderson writes an article on "Bookbinding: its Processes and Ideal"; which is interesting as far as regards the description of the processes and the critical analyses of the leading styles of bookbinding in the past; but the connexion of the art of bookbinding with our conception of the universe, &c., &c., is an example of the foolish and exaggerated cant with which artistic subjects are now too often treated. Bookbinding is an interesting and charming craft; its connexion with "the harmony of the universe" appears to us somewhat remote.

To the *Pall Mall Magazine* the Duke of Marlborough contributes an article on "Blenheim and its Memories," with several illustrations of the interior and exterior of the famous mansion. A not very good drawing of the interior of King's College, Cambridge, forms an illustration to a not very good sonnet on the building. Mr. Procter's illustrations to a poem of Mr. Rudyard Kipling's "Back to the Army Again," are admirable in character and vigour; we wish they may induce some attention to the very serious point raised in the poem itself, in regard to a matter which may be of vital concern to all Englishmen some day.

The *English Illustrated Magazine* contains an article, by Mr. Lionel Cust, on "Grinling Gibbons," with a number of illustrations of his work. The article is a good piece of critical annotation. "Some Recent Advances in Landscape Photography" is the subject of an article by Mr. Derech, but the illustrations do not in the least tend to alter the opinion we have often expressed that for "landscape with figures" photography is and must be a failure, because it is impossible for photography ever to get the sentiment of the figure as a painter can give it.

In the *Gentleman's Magazine*, Mr. J. G. M'Pherson writes on "Cloud, Fog, and Haze," discriminating between the physical causes which produce each, and on the causes of the difference between town and country fogs. He has no remedy to offer for the former, however, except the old one of more legislation over domestic fires.

In the *New Review* the Earl of Meath writes on "The Possibilities of the Metropolitan Parks"; in the course of the article he suggests, and rightly, that the Royal Parks are capable of much greater improvement: "there is an untidy, unkempt look about the larger part of them"; they are neither wild land nor cultivated, but something between the two; "the gravel walks destroy their wild character, and yet the edges of these paths are never properly maintained, nor is the grass cared for." It would need a good deal of money to keep Hyde Park in the desired state, but something more could certainly be done with it than is attempted at present.

The *Antiquary* contains Dr. Cox's paper on "Some Archaeological Errors and Fictions," read at the recent Congress of Archaeological Societies, and one by Mr. F. Gautier giving some information on the contents of "The New Museum at Rome," the *Magazzino Archeologico*, opened on May 7th.

The *Quarterly Statement* of the Palestine Ex-

ploration Fund gives Mr. Bliss's account of the commencement of a new series of excavations at Jerusalem, on Mount Zion; much has not been done yet, but expectations are entertained that the excavations will have important results. The same contributor gives an account of some excavations on the plain of Jericho, pursued while waiting for the permit for Jerusalem excavations, and which resulted in the finding of some carved fragments (illustrated) pronounced by Major Conder to be either early Crusaders' or late Byzantine work.

The *Essex Review* (quarterly) gives an account and plans and sketches of two small churches, St. Mary, Salcot Wigborough, and St. Mary-the-Virgin, Salcot Virley, by Mr. F. Chancellor; and an article on the origin of the curious and exotic name of "Billericay," borne by the small town on either side of a long straggling street which runs along the top of a rising ground in the middle of the county. Billericay was a somewhat important place once, though now the quietest and most sleepy of country towns.

Nos. 10 and 11 of *Punch Pictures* continue as interesting as the previous issues.

#### BUILDERS' ACCIDENT INSURANCE COMPANY.

THE thirteenth annual general meeting of this company was held at the registered offices, 31, Bedford-street, Strand, W.C., on the 26th ult. Mr. Stanley G. Bird, Chairman, presiding.

The notice convening the meeting having been taken as read, the minutes of the meeting of August 15, 1893, were read and confirmed. The secretary, Mr. R. S. Henshaw, then read the following report and audited accounts:—

1. In presenting their thirteenth annual report, the directors record with much satisfaction that there is an increase of 213*l.* 14*s.* 5*d.* in the premium income of the company, and a diminution in the amount paid in claims of 1,447*l.* 19*s.*, as compared with last year.

2. During the twelve months under review, the company has dealt with 602 accidents, including 56 under Class 3, as compared with 605 and 62 respectively for the year 1892-3.

3. In consequence of the heavy claims during the previous four years, and in view of the expected introduction of a new Employers' Liability Bill, the directors considered it desirable to consult Mr. George King, F.I.A., F.F.A., the actuary, who has made full reports on the specific points of the business of the company referred to him by the directors, which will be of great assistance to the Board.

4. The remuneration of the directors for their services during the past year will, as usual, be left to the members in general meeting.

5. The directors much regret to have to record the death of one of their colleagues, Mr. Robert Dennett, of Nottingham, President of the National Association of Master Builders of Great Britain, but they do not propose, at any rate for the present, that the vacancy shall be filled. They also regret to announce the death of Mr. William Knox, the secretary of the Northern branch, who had served the company so faithfully since its establishment. The Northern committee has appointed Mr. J. A. S. Hassal to act as their secretary.

6. In accordance with the articles of association the following directors retire, Messrs. W. Brown, F. J. Dove, and J. Stevenson Jones, all of whom are eligible and offer themselves for re-election.

It was proposed by the Chairman and seconded by Mr. Wm. Dunk,

"That the report and audited accounts be received and adopted."

Mr. A. Stewart-Harrison said nothing could indicate better the confidence that the members of the society felt in its direction than the fact of the very small meeting; and, therefore, in speaking to them he hoped he was speaking not only to those present, but, through the press, to those who were not present. There were one or two points in connexion with the accounts laid before them on which he wished to make some observations, not in any hostile spirit, but simply with a view of drawing attention to what he might term the excellence of the society itself. He noted that the amount of expenses was 1,712*l.* per annum, that the premiums amounted to 6,852*l.*, and the expenses, therefore, were 25 per cent. of this amount. The claims were 4,539*l.*, and the expenses 37*l.* 7*s.* 7*d.* per cent. of this amount. Weekly the expenses were 32*l.* 18*s.* 5*d.*, and taking eleven directors, because he assumed that the Chairman and the two vice-

chairmen were members of the Board, the fees for the directors amounted to 36*l.* 7*s.* per year each if equally divided. Taking the premiums paid, 6,852*l.*, it covered the annual amount of 2,284,000*l.*, and assuming the average wages of mechanics and labourers together at 35*s.* per week, this meant 43,923*l.* per week distributed among 25,100 men, and taking the claims at 4,539*l.*, it meant that the average per man was 3*s.* 7*d.* per annum, and he thought that these figures showed most clearly that the

builders who were members of the society conducted their business in a way that showed that they regarded very carefully the lives and limbs of the workmen they employ. Practically, it would mean that if the men were themselves forming a fund to meet these claims they would have to sacrifice about one-sixth of their annual earnings. There were some questions which he wished to ask: (1) How the 1,288*l.*, which was put down as salaries, rents, &c., was made up? (2) Who received the commission of 8*l.* 2*s.* 5*d.*, and why? (3) Were the solicitors' and the law costs included in the claims amount of 4,539*l.*? (4) Why did the directors propose not to fill up the vacancy on the Board? (5) How were the directors elected, and had they the power to leave a vacancy? (6) What was the advantage of the union of London and Liverpool? (7) What was the expense of the union as to fares and the like? (8) Where were the Board meetings held, and where were the committee meetings held? It was quite evident that if the Board was in London the Liverpool members must be at the expense of attending, and he assumed this did not come out of the 400*l.* directors' fees. If the Board was in Liverpool, then the expenses were incurred by the London members. (9) Could any scheme be devised by which the older members could derive some advantage from not having made any claims during their membership, and also would the directors report on this at the next meeting of the members? With regard to the last question he was not sufficiently familiar with actuarial matters to know if this could be done, but he was strongly of opinion that where a member had been subscribing or paying a premium for fifteen or twenty years he ought to be placed in a better position than a new member. At present such member derived all the advantage of twenty years' experience and expenses which had been borne and acquired by the older members.

Several other members having spoken, the Chairman said that they had to thank Mr. Stewart-Harrison for the elaborate criticism which he had made of their report and accounts, but that he was unable to accept his figures as correct, and particularly he could not agree that the average wages of mechanics and labourers was 35*s.* That would be something like the London rate of wages, where mechanics were paid 93*d.* and labourers 61*d.* per hour; but it must be borne in mind that many thousands of the workmen insured in this company were employed in the country, where wages were as low as 4*d.* for labourers and 7*d.* for mechanics. The item of 1,288*l.* for expenses of management was made up of salaries, rent, advertising, printing and stationery, general office expenses, petty cash, postage, directors' travelling expenses, and general law costs. The law costs appertaining to the several claims were, however, included in the amount of claims, 4,539*l.* The commission, 8*l.*, was paid to agents for the introduction of business. The directors were elected by the members of the company in general meeting, and under the articles of association the directors had the power of leaving a vacancy unfilled when it occurred. They did not propose filling the vacancy caused by the death of Mr. Robert Dennett, as there were a sufficient number of directors in London and in Liverpool to form the separate committees, and by leaving the vacancy there would consequently be a reduction in the travelling expenses. The advantage of having an office in Liverpool was, that building operations were carried out in an entirely different manner in the North of England from what they were in the South, so that it was considered desirable to have a certain number of directors sitting in the North who were thoroughly conversant with the customs of the trade. In addition to that, there was little doubt but that a large amount of business was brought to the company from the fact of it having a number of northern directors. The business of the company was conducted by two committees, one sitting in London, and the other in Liverpool. The Board, which consisted of the two committees, meets in London probably two or three times in the course of the year, for the purpose of considering the general business of the company.

\* We omit the statement of accounts from this report.



apart from the actual routine business which was conducted by the respective committees. As to the possibility of devising a scheme by which the older members should derive some benefit, the matter was having the serious consideration of the Board, and if it was possible to devise such a scheme, the members might rest assured that the directors would leave no stone unturned to do so, as it was a strictly mutual company.

The Chairman then put the resolution to the meeting, which was carried unanimously.

Mr. A. Stewart-Harrison said he had much pleasure in moving the usual resolution that the honorarium of 400*l.* be allowed to the directors for their services during the past year. The whole of the directors were thoroughly practical men, intimately acquainted with all the risks run by the various trades in carrying on building operations, and it would not be possible to have better judges of what constitutes a fair and reasonable claim than the gentlemen who now occupied seats at the Board. He believed in considering the claims they had acted with a just and fair-minded liberality, and it spoke well for the building-trade that so small a sum should be legitimately claimed against them for want of care with regard to the safety of their workmen. There was one point that he should venture to put, and it was this: Whether, seeing that the numbers of the directors was to be diminished, and the Chairman had said that they did not propose to fill up the vacancy for economic reasons, whether the fees to eleven directors should be the same as to twelve; if that doubt, was a question the Chairman would answer.

There was also one other point when speaking of the directorship, and that was the question as to when the directors filled up the vacancy, whether they would not endeavour to find a representative of the smaller interests of the building trade; whether they would not fish, if he might use the expression, in somewhat shallower streams. The large men, employing their hundreds of workmen, were well represented on the Board, but the smaller men, employing from ten to fifty, he did not think had any representative.

The Chairman stated that it was not proposed to reduce the fees of the directors in consequence of the vacancy on the Board, as the fees were payable in respect of the past year, during a considerable portion of which time Mr. Robert Dennett was a member of the Board. When it was considered desirable to fill the vacancy, the directors no doubt would bear in mind the suggestion made by Mr. Stewart-Harrison.

It was proposed by Mr. Wm. Dunk, seconded by Mr. Wm. Southern, and resolved "That Mr. Alderman W. Brown be and is hereby re-elected a director of the company."

It was proposed by the Chairman, seconded by Mr. Stewart-Harrison, and resolved, "That Mr. F. J. Dove be and is hereby re-elected a director of the company."

It was also proposed by Mr. H. H. Bartlett, seconded by the Chairman, and resolved, "That Mr. J. Stevenson Jones be and is hereby re-elected a director of the company."

It was proposed by Mr. J. Stevenson Jones, seconded by Mr. Wm. Dunk, and resolved, "That a vote of thanks be tendered to Mr. Stanley G. Bird for his services as Chairman during the past year, and also for presiding over this meeting."

It was proposed by Mr. H. H. Bartlett, seconded by Mr. Wm. Southern, and resolved, "That a vote of thanks be tendered to Mr. Joseph C. White for his services as vice-chairman of the company and Chairman of the Northern committee during the past year." The proceedings then terminated.

**STRIKE IN THE BOLTON BUILDING TRADE.**—The stonemasons of Bolton struck work on the 31st ult. through a dispute as to dressed stone brought into the town. The trade union regulations stipulate that stone introduced from other places shall not be dressed or sawn on more than two sides, while the employers refuse to be bound by this limit. The Building Trades' Federation have sided with the stonemasons. It is expected that a general strike, involving several thousand workpeople, will result.

**THE SANITARY INSTITUTE.**—At an examination for Inspectors of Nuisances held at Birmingham on July 27 and 28, the following nine candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspector of Nuisances:—Joseph Henry Ablett, Birmingham; E. J. Leo Bosward, Birmingham; Edward Carr, Birmingham; Shafto John Chapman, Norwich; Thomas Fenn, Shawcross, Dewsbury; Arthur Floyd, Leeds; Arthur James Gray, Birmingham; William Nathaniel Jarvis, Kingsbridge; William Vincent Macdonald, Manchester.

### COMPETITIONS.

**LABOURERS' COTTAGES, LONGFORD, IRELAND.**—The competition for these buildings has just been decided, with the result that Messrs. Blower & Slatter, of Curzon Chambers, Birmingham, and Mr. R. Gleave, A.R.I.B.A., of 26, Arundel-road, Croydon, Surrey, have been bracketed together, the premium of 10*l.* being divided.

**BOARD SCHOOL, SHEFFIELD.**—At the monthly meeting of the Sheffield School Board, held on the 19th ult., the Buildings Committee, having examined fourteen sets of plans submitted by Sheffield architects for the proposed school at Tinsley Park-road, recommended the acceptance of one which, upon opening the envelopes accompanying the plans, it was found had been submitted by Messrs. Holmes & Watson, St. James' row. The plans coming next in order were from Mr. C. J. Innocent, Mr. W. J. Hale, Messrs. Holmes & Watson, and Mr. J. R. Wigfull. Mr. Fletcher thanked the architects of Sheffield for having sent in such a number of plans. Mr. Innocent and Mr. Hale were awarded the premiums of 15*l.* and 10*l.* respectively offered by the Board for the plans considered to be second and third in merit.

**NEW OFFICES, &c., LITTLEBOROUGH.**—Messrs. Woodhouse & Willoughby, of Manchester, the assessors appointed to adjudicate and advise the Littleborough Local Board upon the designs sent in in this competition, have awarded the first premium to Design 23, by Messrs. Clark & Hutchinson, of 28, John-street, Bedford Row, W.C., and the second premium to Design 14A, by Messrs. Duncan & Butterworth, of South Parade, Rochdale. The Assessors' report has been adopted by the Local Board.

### A WINDOW AT ALL SAINTS', LOUGHBOROUGH.

THE small Perpendicular window inserted in the south aisle, All Saints', Loughborough, shown in the accompanying sketch, has given rise to a good deal of discussion. The explanation of its origin seems to me very obvious, but it may not be uninteresting to refer to the history of this part of the church, and the reasons that determine one's conclusion.

The church had in the first instance a single aisle and transept; the plinth of the latter can be traced at the east end of the second aisle. The arcade which divides the two aisles was put up by the fourteenth-century builders when they erected the additional aisle with the large windows, which they no doubt filled with rich glass. The respond against the west wall of the transept shows how the earlier work was redressed and brought into use. It was a hundred years or more after this—that is, late in the fifteenth century—that the little window appeared. Walled up now on the outside, it was walled up inside and out at the time of the restoration of the church, commenced by Scott more than thirty years ago. Originally it was glazed, and had an outer arch and jamb not very dissimilar to those in the belfry stage of the tower, and, being much decayed, was some time in the last century walled up, we may suppose, as the easiest way out of the necessity for repairs, the need of the window having from their point of view ceased; and probably they carried it so far as to wall and plaster it across on the inside also.

There is an engraving dated 1790 which shows the south side of the church, but without any trace of the small window; it must therefore have been walled up prior to this.

The altar in the south aisle of many Medieval churches brought with it a special arrangement of window: thus an aisle with two-light windows would have the easternmost window a three-light, as at Elm Church, near Wisbech, where a Perpendicular window replaces the 14th century two-light; or the window would be kept very close to the east wall, as at Addlethorpe Church, Lincolnshire. And the window and the piscina, and sometimes the sedilia were combined. Other examples that occur to me are at

Hawton, Nottinghamshire, and Long Stanton, Cambridgeshire.

Thus, late in the fifteenth century, when, as we may surmise, a wealthy donor gave the altar-piece he desired in addition to the screens and other necessary adjuncts a special effect for his gift, and it should be borne in mind the Medieval men when they made changes or additions had small veneration for the work of those who preceded them, and used up again or destroyed to suit their own ends. What the donor desired was a special effect of light upon the rood and sculptures of the altar; the fourteenth century windows referred to previously, filled with rich and deep-coloured glass, were neither in harmony with the period, his taste, or the effect he required, and he, therefore, had this small window inserted, regardless of the adjoining work, filled it with the delicate glass of the fifteenth century, illustrating, probably, the life of the saint to whom the altar was dedicated, and combining with it the piscina, the whole being designed as part and parcel of the altar and altar-piece.

Of the latter nearly every trace has disappeared. All that is left are three mutilated carved corbels and some other traces of tabernacle work, the sculpture canopies and more delicate work having all vanished.

These subtleties of effect are by no means unusual in Medieval times; there are numerous references to them in old manuscripts, and as a matter of fact they are not unknown in our own day, while on the Continent they are still practised to a pernicious extent.

Since writing the above I have heard that this part of the aisle is sometimes alluded to as having been "Burton's Chantry." I knew Thomas Burton had been a great benefactor to the town. He was a merchant of the Staple of Calais, and died in 1496. His munificence and the above facts seem to point to him as the wealthy donor of the fifteenth century who inserted the small Perpendicular window.

W. SAMUEL WEATHERLEY.

### ROYAL ACADEMY.

**ADMISSIONS TO ARCHITECTURAL SCHOOL.**—The following candidates have been admitted, to the Architectural School of the Royal Academy: Mr. R. Phené Spiers, master. *Upper School*:—



C. R. R. Clarke, W. H. Hazell, G. J. J. Lacy, T. G. Lucas, A. W. Newman, A. A. Reeve, T. A. Sladdin, G. Weald. *Lower School*:—H. Budden, F. Chatterton, A. George, A. Stratton, J. Watson.

## Illustrations.

## DESIGN FOR CHRIST'S HOSPITAL SCHOOLS.

**WE** devote the illustrations in this number to Messrs. Paley & Austin's design in this competition, giving the general view of the buildings, the scale drawings of the hall and class-rooms, those of some of the boarding-houses, and the block plan of the whole. The following extracts from the report sent in by the architects with the design will serve to explain their intentions:—

**"General Scheme.**—On passing through the clock-tower entrance, the educational division and chapel lie to the left-hand on the east, and the residential division to the right-hand on the west, with the preparatory school still further west, and on the other side of Chelshams-road. The main quadrangle entered through the gateway has its east, west, and north sides bounded by a covered-in cloister 15 ft. wide, from which communicate directly all the educational buildings, the governors', secretaries, and masters' common rooms, the museum, library, chapel, dining hall, and music house.

**Central Hall.**—This room is completely surrounded by an 8 ft. corridor in two heights, with fifteen class-rooms opening directly from it on each floor, with ample staircases at both ends, and with observation windows from the corridors to each class-room. The hall is lighted by a continuous clearstory all round, the windows at certain intervals being continued directly to the ground, so as to ventilate the corridors—a matter of great importance. An internal gallery is designed to run completely round the roof, with dormer windows opening directly on to it for ventilation; the gallery itself being available for heating pipes to prevent down-draughts, and for the conduction of the electric wires. Its floor would be covered with thin lead, and the turret staircase conducting to it would be kept strictly under lock and key. There is a large extracting ventilator placed on each side of the hall, and there are convenient rooms and special entrance for the head-master. In case the central hall may be thought too ample we have shown a reduced plan to a smaller scale, with a reduction of 6 ft. in width and 20 ft. in length, by which the same arrangements of class-rooms, corridors, &c., could be carried out without seriously detracting from the general utility in any important degree.

**Class-rooms.**—We propose to ventilate the class-rooms by electric fans placed centrally over each block in connexion with extracting flues, in addition to the complete through ventilation which is provided by means of opening and falling-in casements. Fresh-air inlets are also provided in connexion with the hot-water coils.

**Science Schools.**—These are placed near to the central hall, with ample room for future extension. The ventilation from the fume closets is intended to be by brick flues, with steam-coils placed in a chamber at the top and near the outlets.

**Museum.**—This is shown of the specified size, but we have thought that much additional future space might be inexpensively gained by means of the gallery shown on the plans.

**Chapel.**—We have not followed the more usual plan of a school chapel, but have adopted a scheme with a low central tower, an example of which occurs at Merton College. The shortened aisles would allow of easy enlargement in the future, if required, in connexion with the girls' school, and would afford opportunity for using the several blocks of seats for different divisions of boys with separate access. One aisle might be omitted entirely at first, to save expense, and the arches be temporarily built up. It is intended that the groining should be of wood.

**Head-Master's House.**—This is placed immediately south of the main quadrangle, and would be easily accessible; it would be quiet, and have a pleasant view and garden to the south. The floor level would be 180'0, and a certain amount of terracing might be required, but not to any important extent—3 ft. or 4 ft. at the most.

**Medical Officer's House.**—This would be situated to the west of the head-master's house, and near to the infirmary, with ready access to the sanatorium road, and with pleasant view and southern position.

**Sanatorium.**—This is located in the extreme south-east corner of the property, on high ground, with a floor level of 184'0, and with an excellent and airy prospect. Its main sewer to Stammerham would have a fall of about 1 in 115. We have taken the liberty of somewhat departing from the instructions in this instance, by making this building on two floors only. It appeared to us to be impossible to wholly utilise, without waste, the ground floor as described in the instructions; but all the rooms and arrangements for isolation have been provided in full.

**Infirmary.**—We have placed this to the south-west of the main buildings, so that patients could be conveyed directly to the sanatorium from it, without passing through the main school grounds. The





## HOSPITAL

HORSHAM, SUSSEX.

STIN & PALEY, ARCH<sup>TS</sup>



floor level would be 178'0. We are much indebted to Dr. Alder Smith for his suggestive plans of this and the sanatorium.

**Residential Houses.**—These are planned so as to obtain the greatest amount of light, ventilation, and healthfulness possible, with convenient arrangements for the service. One most important point was difficult to arrange, and that is, covered ways for the servants and boys to the dining-hall. This has been secured with the minimum expense by putting the boys' corridor over that for the servants, a continuous basement being also provided as a subway for pipes, &c. Thus in stormy weather or after dark the boys and servants could reach the dining-halls from all the houses under cover, and entirely distinct from one another. It is provided for these corridors to be completely severed and open to the air at intervals, so as to run no risk of infection in case of any outbreak of illness. The five residential blocks are arranged around the kitchen department, and in certain cases have their end wings inclined outward at an angle, so as to afford more space between the offices. Two calorifiers are proposed to each block, and situated in a basement under a portion of the matron's block; these chambers would be connected directly with the subways along which the steam-pipes would be brought to the calorifiers, one of which would heat the low-pressure hot-water system, and the other the pipes for the hot-water service to baths, lavatories, &c. A system of natural ventilation is provided generally throughout the houses, by means of open fireplaces with extracting flues in addition at ceiling level, and by means of ample falling-in casements above the transom on both sides of dormitories and day-rooms, and opening swing casements below the transoms, supplemented by fresh air admitted over the hot-water pipes, which in day-rooms would be coils in window recesses, with inlet grids and outlets to rooms at window-sills, and in the dormitories and corridors continuous pipes at floor level with shades to divert the incoming air over the hot pipes, which is admitted by inlet grids placed at intervals in the outside wall.

**Flat System.**—We have prepared a plan on this system, but find that it involves more cubical contents than the usual plan, viz., about 60,000 ft. in the largest block. We hardly think that in practice this plan would be found more convenient. . . .

**Preparatory School.**—This, as already stated, is separated from the main schools by the Chelsbams-road and by the adjoining copse, which, with all trees on the property, we propose, as far as possible, to retain. These we have marked on the block plans in all cases. The residential block would be similar in general treatment to the other blocks, but varied as required to meet the smaller number of boys, and its situation. A covered playground is provided, as there is no cloister. The head-master's house would have a good southern aspect. . . .

**Fireproof Floors.**—All upper floors to be of fireproof flooring on the Fawcett system, with 1½-in. boards laid direct and spiked on to the breeze concrete, which would be coated with a thin layer of asphalt before the boards are laid. All ground floors, where indicated, to be laid with pitch-pine wood blocks on bed of well asphalted concrete.

**Materials Generally.**—We propose that the walls should be built of sound, well-burnt, local brick, which, from what we learn, could, most probably, be made on the property. The facing to be of machine-made wire cut bricks similar to those manufactured by Thos. Lawrence & Sons, Bracknell, Berks, and which have been used throughout the new buildings at Egham Holloway College, plainly pointed with understruck joint. Lead for all roofs and gutters to be not less than 7 lbs.

**Stone.**—We have thought that for so important a building, and which is intended to be of lasting description, stone in preference to terra-cotta should be used for dressings, and, on account of its colour and durability we propose Ancaster stone, from the Lindley Quarries; or, if found too expensive, Ham Hill or Brown Hartsham Park. Tenders, if obtained, might be asked for in both descriptions. In such test estimates as we have made with a view of arriving at a basis of price, we have allowed 6s. per cubic foot, worked and set. We propose to line the central and dining halls and chapel with sawn stone, in courses; and to face the chapel outside in stone in varying courses.

**Slate.**—On account of dryness and durability, we propose green Westmoreland slate for all the roofs, excepting that of the chapel, which we propose to be of Yorkshire stone slate; and some of the smaller houses might be tiled, by way of variety. . . .

**Ventilation and Heating.**—In addition to the description already given in connexion with the residential buildings, which may be taken as a type, we may say generally that we have provided for a natural system of ventilation by means of ample air spaces round all buildings, by through ventilation by means of opening windows, and by admission of air over hot water coils and pipes. Extraction would be by open fireplaces and flues from ceiling level, and in the case of the main class-rooms and preparatory school by electric fans, and in laboratories by steam-coils as described. The heating would be by low-pressure hot water heated in calorifiers, by steam, which would be generated at the central boiler-house.



#### WINGFIELD MANOR BAY WINDOW.

This sketch shows a bay window on the north side of the Quadrangle. It would seem to have lighted the hall, with a row of traceried windows as well, of which now nothing remains but ruins. The chapel and great state apartment was to the left of this hall, with the north porch and fine window in the chapel (?) gable, on the same elevation as the bay window. The whole of the Late work is very fine, with rich tracery and moulded jambs. The manor suffered in the wars of 1643, when it was taken by storm, probably by the Royalists.

E. B. LAMB.

### Correspondence.

To the Editor of THE BUILDER.

#### SEWER VENTILATION.

SIR,—The objection made to my plan of admitting fresh air into a sewer near the invert, on the ground that it might get stopped by the flow of the sewage, would apply with equal force to the

circumstances. With due consideration to this point I would still contend that the lower the inlet vent-pipe enters the drain the better.

The usual plan of admitting cold air at the top of an inspection chamber and extracting the foul air from the bottom of the chamber is a failure, admitted by the use of talc doors to prevent a back draught.

This is frequently the only way in which any ventilation can be obtained; but when I have found it possible to admit the cold air at the bottom of the chamber, and to take the outlet from the top of the chamber, I have done so with remarkably satisfactory results. I enclose an illustration of a case in point, which I tested by firing off two smoke rockets at once, and could get no smoke into the inlet vent-pipe until I closed the mouth of the outlet vent, when the smoke rose very gradually in the inlet vent, but immediately receded when the outlet was uncovered.

The tendency of cold air to fall and hot air to rise is quite sufficient to account for the superiority of my plan over the more usual method, and I would therefore venture again to urge its adoption for both sewer and drain ventilation.

ARTHUR BAKER.

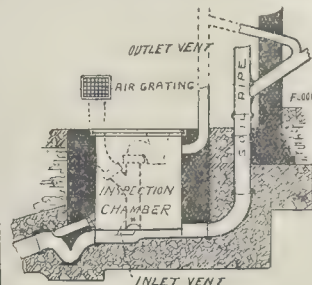
#### DEPOSITS FROM COMPETING ARCHITECTS.

SIR,—I feel sure that you have expressed the wishes of the profession at large in your Note on the question of deposit fees for instructions and conditions for a sole competition. An instance in point came to my notice last week, when a deposit fee was asked from competitors who intended to apply for the conditions of a competition for the "Halifax and Huddersfield Bank." For these I applied, stating that I should be happy to forward the deposit on condition that it should be returned within a reasonable stated time, as many unforeseen circumstances in business arise to prevent the completion of a design owing to pressure. I added that I was sure the bank directors had no desire to make a profit off intending competitors, and awaited the managers' reply, which was that they had no intention of returning any deposit-money except on receipt of a design.

WM. A. PITE, F.R.I.B.A.

#### DARLINGTON PROPOSED NEW SCHOOL COMPETITIVE DESIGNS.

SIR,—My attention has been called to a paragraph in your last issue referring to these designs, and



drain from the house, which is always placed as near the invert as possible.

The position of both should be regulated by cir-



stating that Mr. E. R. Robson, architect, London (to whom the designs had been submitted by the School Board), had placed them in the order given in your paper. Mr. Robson did not place any other plans in order of merit beyond the 1st and 2nd. I think in fairness to the other competitors this letter should appear in your next issue.

F. T. STRAVENTSON,  
Clerk to School Board, Darlington.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—VI.

PUMPING BY STREAM, GAS, PETROLEUM, WATER, AND WIND POWER.

**T**HE various systems of motive power for pumping are determined by the work to be performed, the accessibility of the pumping station, and by local and other conditions depending upon the particular circumstances of each case.

The unit of power in common use is the mechanical power necessary to perform a certain amount of work known as a horse-power, and is equal to 33,000 lbs. raised 1 ft. high per minute. The terms used to express horse-power being somewhat indefinite, a brief reference may not be out of place.

*Nominal Horse-power* is a commercial term for stating the size of an engine without regard to the actual power it will develop.

*Actual or Indicated Horse-power* is the power calculated from a diagram of the work performed by the steam in the cylinder, one horse-power being equal to 33,000 lbs. lifted 1 foot height in one minute, or

$$1 \text{ h.p.} = \text{Units of work "done" per minute}$$

*Effective or Brake Horse-power* is measured by a friction brake or dynamometer, and represents the indicated horse-power less the power absorbed by the working of the engine or motor.

In these papers it is only proposed to refer to the indicated horse-power except where otherwise stated.

*Steam-power* as applied to pumping for water-works is of general application, and the results are more economical for heavy pumping than any other system. The engine for applying the power takes several well-known forms, among which may be mentioned the vertical, horizontal, beam, and Cornish engines, each of which has several types. Steam-engines are divided into two main systems—non-condensing and condensing. The former exhaust their steam direct into the atmosphere, and the steam is used at full pressure, either partially or throughout the stroke, sufficient allowance being made to cut off and avoid back pressure. Condensing engines exhaust their steam into a condenser, which is in a state of partial vacuum owing to the steam coming in contact with a number of tubes through or around which cold water is circulating, or, in some cases, a jet of cold water. The air and condensed water are removed by an air-pump, which is worked from the engine. The water from the condensers having an average temperature of 100 deg. Fahrenheit is used for feeding the boilers, but care must be taken to prevent grease getting into it and thus injuring the boilers. Condensing engines are divided into systems according to the number of expansions employed—viz.: simple or single cylinder, compound or two cylinders, triple or three cylinders, and so on as the range of expansion increases. The simple engine consists of a single cylinder in which the steam is exhausted into the condenser after having done its work. The compound engine consists of two cylinders; the steam after being partially expended in the small or high-pressure cylinder is exhausted into the large, or low-pressure cylinder, and there undergoes further expansion before being exhausted into the condenser. The chief difference between the simple and compound systems is that in the former case the whole of the range of temperature occurs in one cylinder, whereas in the latter it is divided between the two cylinders, and the loss due to the extreme variation of temperature in one cylinder is thereby prevented. Theoretically the low-pressure cylinder with steam pressure and expansion the same as the high-pressure cylinder worked on the simple or single system would develop more power than the two combined, but practically, owing to the various losses that occur, the theoretical results cannot be attained.

The advantages of the non-condensing engine are:—

1.—The simplicity of the mechanism and construction.

2.—The easy accessibility to its working parts, and

3.—Inexpensive foundations.

In fuel economy, however, it does not compare favourably with the condensing engine for permanent work. It is chiefly used in water-works for temporary purposes, or where only a small engine is required.

The advantage of the condensing engine is its economy of fuel. The first cost is high, and the foundations are expensive, but for heavy pumping the satisfactory working of these engines, together with a fuel economy of about 25 per cent. over the non-condensing engines, outweigh any other considerations.

*The Consumption of Coal per I. H.P. per hour.*

Non-condensing engines ..... from 4 to 7 lbs.  
Condensing engines (simple) ... 3 to 5 lbs.  
" (compound) ... 1½ to 3 lbs.

*Gas-power* is utilised by the explosion of a mixture of coal gas and air in the cylinder, which, acting on the piston, gives the requisite motion. The charge consists of air next the piston combining gradually with a mixture of gas and air, which becomes stronger until the firing-point is reached. This gradual increase of explosive strength has the effect of doing the work gradually and preventing shocks, as well as sustaining the pressure to the end of the stroke.

Pumping by gas has many advantages over the use of small steam-engines:—

1. There is no loss when the engine is not working.

2.—It can be started by merely turning the gas on and lighting the jet, at the same time giving the fly-wheel a start.

3.—It can be fixed in almost any position, and requires no attention, as must be the case when a boiler and steam-engine are used.

There are many forms of these engines, each claiming special advantages, and all giving satisfactory results.

The consumption of gas per indicated horse-power varies from 17½ cubic feet per hour in the larger engines to 25 cubic feet per hour in the smaller sizes.

Where the ordinary illuminating gas is either too costly or not available, the Dowson Gas Producers are frequently adopted, giving a non-illuminating gas which costs from 3d. to 4d. per 1,000 cubic feet.

*Petroleum-power* engines differ from the gas-engines chiefly in the method of delivering the oil in measured quantities with the requisite proportion of air. The oil is stored in a tank of sufficient capacity to serve twelve or twenty-four hours as required. The firing light is obtained from the flame of a lamp kept continually burning. The advantages of this engine for pumping are:—

1.—The cheapness of the oil.  
2.—The slight amount of attention required.  
3.—The small capital cost.  
4.—The facility of fixing in any position.

The cost for oil varies from 3d. to 1½d. per indicated horse-power per hour.

*Water-power* may be utilised for pumping in several different ways, among which are hydraulic rams, water-wheels, and turbines.

The hydraulic ram is frequently applied when the water is abundant and the fall moderate. The action is as follows:—The momentum of the inflowing water when arrested is expended in forcing a portion of itself through the delivering-pipe into a tank or reservoir.

If H = Height of source of supply above the ram.

If h = Height to which the water is to be forced.

If Q = Volume of supply.

If D = Volume delivered.

$$D = \frac{Q \cdot h}{H}$$

The advantages of the ram are:—

1.—The simplicity of its parts.  
2.—The facility with which it can be fixed.  
3.—The little or no attention required.  
4.—Its moderate cost.

*Water-wheels* for driving pumps and other purposes are named according to the way in which they are acted on by the water.

1.—*Overshot* when the water is delivered on the top of the wheel.

2.—*Breast* when delivered about the centre, and

3.—*Undershot* when driven from the bottom, where there is a considerable velocity in the water. The overshot wheel gives the greatest power with the least expenditure of water, and is therefore applicable where the supply of water is scanty.

The horse-power (effective) is calculated as follows:—

$$E. H.P. = \frac{Q \times H \text{ in feet.}}{C}$$

Q = Quantity of water in cubic feet per second.

H = Effective height of the fall in feet.

C = 13 for overshot wheels;

15 for breast wheels;

11.7 for high breast wheels;

22 for undershot wheels.

*Turbines* when carefully designed with regard to the conditions of working are the best and most efficient motors. They are divided into two classes—Pressure and Impulse turbines, the former acting partly by impulse and partly by pressure, and the latter entirely by impulse. The turbine consists of a cylinder revolving horizontally, to which are attached spiral discs. The water is introduced at the top, and by its pressure on the sides and bottoms of the spiral chambers causes the cylinder to rotate. The power is applied to the pumps by means of suitable gearing. In some cases an efficiency of 78 per cent. of the total power expended has been attained.

Actual H.P. = .079 Q h.

Q = quantity of water passed through in cubic feet per second.

h = height of the fall in feet. The theoretical horse-power contained in the water is calculated as follows:—

T. H.P. = .001892 Q h.

Q = 528.5 T.H.P.

h =

Q = quantity of water per cubic feet per minute.

h = head of water in feet.

*Effective Horse-power for different Motors.*

Theoretical power being ..... = 1.00

Turbine ..... = .70

Overshot wheel ..... = .68

High breast wheel ..... = .60

Hydraulic ram ..... = .60

Breast wheel ..... = .55

Undershot wheel ..... = .35

*Wind-power* is only economical for intermittent work, or where sufficient storage is provided for two or three days' supply. The wind pressure may generally be depended upon for seven or eight hours each day. The modern windmills for pumping are self-adjusting, and give exceedingly good results. They are being largely adopted for private supplies, or where their economical use permits.

$$H.P. = \frac{A \cdot V^3}{1,100,000}$$

A = Total area of sails in square feet.

V = Velocity of the wind in feet per second.

Table of the efficiency of Windmills working eight hours per day with a wind velocity of fifteen miles an hour during pumping.

Dim. of Mill.	Revolutions per min.	A. H.P. developed.	Quantity raised to a height of 100 ft.
12 ft. ...	55 ...	1 1/2 ...	3.375 gals.
15 " ...	50 ...	1 1/4 ...	5,000 "
18 " ...	45 ...	1 1/2 ...	10,000 "
20 " ...	40 ...	1 1/2 ...	12,500 "

Table of Wind Velocity.

Velocity in feet

per second... 12'13" 17'15" 21' ... 24'25"

Velocity in miles

per hour ..... 8'27" 11'69" 14'31" 16'53"

Description of

Wind ..... Gentle... Slight .. Fresh.. Strong breeze. breeze. breeze.

## GENERAL BUILDING NEWS.

**ADDITIONS TO THROAT AND EAR HOSPITAL, LONDON.**—The Committee of the Central London Throat and Ear Hospital, Gray's Inn-road, have adopted the plans of Mr. Ernest Turner for a new out-patient department, and a contract for the erection of the building has been entered into with Messrs. T. Simpson & Sons.

**VILLA-RESIDENCES, BURTON-ON-TRENT.**—Two three-storied semi-detached villa residences are being erected on the Ashby-road, Burton-on-Trent, for Mr. T. Roadknight, from the plans of Mr. R. E. Carpenter, architect, of Burton. Mr. G. Kennard, of Stapenhill, is the builder.

**CHURCH SCHOOLS, MARKET HARBOROUGH.**—New Church schools were opened at Market Harborough on the 1st inst. The schools are situated in the Coventry-road, and with the playgrounds, &c., cover an area of 2,200 square yards. The structure is of red brick and Stamford stone, and has been designed by the architects—Messrs. Everard & Pick, of Leicester—to meet the requirements of the Education Department. The large room is 60 ft. by 24 ft., and there are three class-rooms, each 24 ft. by 14 in. square, the school altogether providing accommodation for 310 scholars. The building,



which has been erected by Mr. F. Dexter, of Market Harborough, has cost about 2,800l.

**PUBLIC HOSPITAL AND DISPENSARY, SHEFFIELD.**

—A new hospital and dispensary, which is to supersede the old building in West-street, is being erected at Sheffield. The new hospital, says the *Sheffield Telegraph*, stands on a site in West-street containing about 5,900 square yards. The plan takes the shape of the letter E. The wards look south and east. At present the Eastern block to Westfield-terrace, nearing completion, is the only portion of the contemplated new buildings that has been taken in hand. It is about one-third of the whole scheme. The architects have so arranged their plans as to allow, on its completion, of the partial removal or alteration of the old hospital, with the view of not incommencing the hospital work during rebuilding. This block, over 170 ft. in length, has a basement story, in which will be storage room, workshops, and lavatories, and a staff-room for the use of the hospital staff; also lavatory accommodation for the out-patients with direct approach from the waiting halls above. There are a drying closet, boiler and engine-rooms, coal-stores, &c., and in the western wing, owing to the rapid fall of the ground, it has been possible to plan a chapel, and also an entertainment or meeting room. To the rear will be the mortuary, laundries, &c., and a covered approach to the Nurses' Home, which is to be erected on the brewery site. The ground floor facing Westfield-terrace is devoted to the out-patients' department, with the accident entrance and the occasional room, and the accommodation with minor accidents, lighted from the top, and private examination rooms leading out of it. There is a waiting-hall for 150 patients in connexion with the dispensing department. Communication with the hospital is by a corridor. To the right, facing West-street, is the administrative department, with porter's residence, matron's office and tradesmen's entrance; a hall with entrance from West-street, and main staircase, Board-room with secretary's office, and other accommodation. To the left are two wards, 29 ft. wide, and for eighteen and sixteen beds respectively, and close at hand private wards, ward kitchen, washroom, and sisters' room. At the extreme ends are sanitary blocks for lavatory accommodation. There is a semicircular ward under the operating theatre, and a hydraulic lift, large enough for an ambulance carriage, will work from the basement through all the floors. The main corridor will be a fresh air lung on every floor, with French casement, having windows opening into the courts; the out-patients' department, the wards, and again the sanitary blocks being isolated by fresh-air disconnecting corridors of approach. The western court will be nearly 300 ft. in length, and at its extremity is placed the nurses' home, accommodating forty nurses. The first and second floors are devoted to the accommodation of in-patients, and are arranged on practically the same general lines. On both floors the grand corridor of communication, about 280 ft. in length, separates the front rooms from the wards. The first floor ward to Westfield-terrace is for boys, and contains eighteen beds. It has an oriel window on one side, and a terraced promenade on the flat roof of the out-patients' department. The centre ward of eighteen beds is for men's surgical cases, and between it and the sixteen-bed ward for women is placed the operating theatre, with students' gallery, and rooms for administering anaesthetics. Across the corridor to the west are special wards, matron's, and night superintendent's rooms, and beyond the principal staircase. To the east are rooms for the resident medical staff, clinical, and microscopic rooms. There are emergency staircases at either end of the corridor. On the second floor, to the east, is situated the children's ward (eighteen beds); in the centre the men's medical ward (eighteen beds), and to the west the women's medical ward. Close at hand is a ward for special cases, and nurses' dining-room, and wards for ophthalmic patients to the east. On the top floor in the centre block, facing West-street, is placed the large kitchen, with larders, store-rooms, servants' hall, and bedrooms for the hospital servants. Lift communication is provided to the wards, and the tradesmen's entrance on the ground floor. The cooking will be carried on by steam and gas apparatus. Fresh air is admitted to low pressure hot-water radiators at the floor level of the principal apartment, and there are ventilating sashes and hoppers in the windows. The extraction of the vitiated air from the out-patients' department is by a ventilating shaft, in the centre of which an iron smoke-stack from the boiler furnaces is located, and the arrangements are calculated for a constant change of atmosphere, and the isolation of this department from the main building. The ventilation of the wards and sanitary blocks is likewise self-contained, the vitiated air from the patients' surplus heat from the ward stoves, and there are fresh-air inlets between the beds to the hot-water pipes. Messrs. Hoden & Son, of Trowbridge, are the engineers. The building is designed in the style of the English Renaissance. The floors and roofs are constructed with Siemens-Martin steel girders, embedded in cement concrete, and the flats covered with asphalt. The block of buildings now nearing completion has been executed in two sections; the basement story commenced in November, 1892, and the superstructure, the tenders

for which were accepted on September 13 last year. The following contractors are employed on the works.—Mr. P. Molloy for the excavation, Mr. George Webster for the masonry and brick-work, Mr. Higgins for the plastering, Mr. H. Waddiford for the plumbing and glazing, and Messrs. J. & J. Rodgers for the painting, all of Sheffield. The Phoenix Fireproof Flooring Co., Manchester, have the contract for the concrete flooring and gardens, and Messrs. John Tomlinson & Son, of Leeds, for the joiners' work. Mr. H. Harlow acted as clerk of works until his retirement from ill-health two months ago, and has been succeeded by Mr. H. Buchanan. Mr. J. Webster is the masons' and general foreman. Mr. Hadfield, of the firm of Messrs. M. E. Hadfield, Son, & Garland, architects, of Sheffield, has designed the building, and is directing the work.

**WESLEYAN CHAPEL, ARTHINGTON, YORKSHIRE.**

—The foundation-stones of a new Wesleyan Chapel at Arthington were laid on the 6th inst. The new chapel will be erected from plans prepared by Mr. W. H. Bevers, of Leeds. It will be built of Shipley stone, with ashlar stone dressings, lined with brick. The whole of the work in the interior of the chapel will be polished pitch-pine, and the windows will be in stained glass. Accommodation will be provided for 150 worshippers. Adjoining the chapel will be a schoolroom to hold about 60 scholars, and in addition there will be a vestry and a caretaker's house. The heating will be by means of hot-water apparatus. The principal contractors are Messrs. Rhodes Brothers, Shipley. The total cost is estimated to be about 1,400l.

**PARISH CHURCH, OBAN.**—This new structure, says the *Scotsman*, occupies the site of the old parish church of Oban, built in 1821. The new church is built after the Norman style, and extends lengthwise 91 ft. by 45 ft. There is a tower and spire, rising altogether to the height of 110 ft. The lighting is effected by six windows on each side, while two circular ones serve the purposes of the gallery. These are glazed with cathedral glass in tinted shades in lead lattice-work. Over the pulpit there is a three-light window of cathedral glass of a special design. The walls of the church are built of bull-faces granite (Ben Cruachan) with dressings of Giffnock freestone, and the tower and spire are built entirely of Giffnock freestone. The tower is constructed for the reception of a clock and bell. There are two main entrances to the building, one on each side of the tower; and a stone staircase leads from the entrance to the gallery. The sitting accommodation of the body of the church is for 450 people, and the gallery 110. The seats are constructed of pitch-pine. The ceiling has been painted a sky-blue tint, and is rounded from the wall by hammer-beams forming a cove. The architect of the church was Mr. Alex. Sharp, Oban, and the contracts were carried out by the firm of D. & J. Macdonald, Oban.

**SWIMMING-BATH, BURSLEM.**—The second section, the first-class bath, of the Burslem Public Baths has just been opened. The bath is smaller than the second-class bath which was opened a few weeks ago, and there is no gallery for spectators. The water space is 60 ft. by 28 ft., the depth being graduated from 6 ft. to 3 ft. 6 in. There are forty-one dressing-boxes. The bath was opened by Mr. F. Bettany, Borough Surveyor and architect of the baths, plunging in the water.

**CHAPEL, PENNETT, STAFFORDSHIRE.**—The new Independent Methodist chapel at High Oak, Pennett, has just been opened. The front of the building is of red brick, with terra-cotta dressings. The chapel will seat 350 persons, and at the back of the rostrum is a gallery for the choir. Connected with the chapel are two vestries. Underneath the chapel is the school-room, which will accommodate 400 scholars, and which has two class-rooms, with accommodation for thirty scholars in each. Connected with the school-room are also a store-room and the room for the heating apparatus. The whole structure is heated with hot water, and is fitted with Stott & Co.'s patent gas fittings. The chapel is fitted with modern seats, and the school-rooms forms are of pitch-pine. The architect is Mr. J. Marsh, and the builders and contractors are Messrs. Marsh Bros., of Pennett.

**WORKHOUSE INFIRMARY, ASTON, BIRMINGHAM.**

The memorial stone of the new workhouse infirmary now in course of erection at the Aston Workhouse, Gravelly Hill, was laid recently. Alderman Johnson, in laying the stone, explained that the new building, which is being erected at a cost of 10,000l., would afford additional infirmary accommodation for 162 patients. The present infirmary corresponded in length to the two previous erections, being 244 ft. long. It included six large wards, each 84 ft. by 24 ft., and with space for twenty-five beds, and six small wards with space for two beds. A nurse's duty-room with cooking-grate, food-safe, and sink was provided at the entrance of each ward with inspection-window overlooking the ward. A stone staircase was placed in the centre of the building, which served both wings, and communication with the wings was obtained by a corridor from each on either side with cross ventilation. The wards would be heated by hot-water pipes, and fireplaces would be provided in addition. There would be 941 cubic feet of air-space for each inmate, and separate isolation-wards

to each of the rooms for the nurses. The work of erection was being proceeded with by Messrs. Lee & Son, of Aston-road, from the designs of Mr. Cooper Whitwell, architect.

## FOREIGN AND COLONIAL.

**FRANCE.**—The competition work for the Prix de Rome has been exhibited at the Ecole des Beaux-Arts during the past week. The successful competitors are as follows:—"Premier Grand Prix," M. Recoura, pupil of M. Pascal;—"Premier Second Grand Prix," M. Patouillard, pupil of M. Guain;—"Deuxième Second Grand Prix," M. Héraud, pupil of M. Raulin. The subject was "Une Ecole Centrale des Arts et Manufactures à Eliever dans la Capitale d'un Grand Pays." Among the recipients of the Legion of Honour decorations awarded on July 14 were MM. Batigny, Chancel, and Roux, architect of the Batiments Civils; M. Sidney Dunnett, architect to the "Nord" Railway Company; M. Jas. Tissot, the painter, and Madame Virginie Demont-Breton, the painter.—The Paris Municipality has initiated two interesting competitions; the first for the best means of purifying river water for drinking purposes, the second for the best means of preventing or diminishing smoking from boiler fires.—The Conseil-Général of the Seine has voted 330,000 francs for the enlargement and repair of the ancient Conciergerie prison. M. Daumet, who has charge of the work, is instructed to preserve the "Cour des Girondins," as one part of the prison is called, in its actual state, and by a large vault acquired, at the price of 10,000 francs, one of the finest examples known of Egyptian sculpture, a statuette carved in wood.—The tower of the church of St. Cloud, which had already been strengthened, has shown so much sign of going that it is feared it will be necessary to entirely rebuild over the Bourgneuil tower on Sunday last, was opened an exhibition of urban and maritime hygiene, and on the same occasion the first stone was laid of the new facade of the hospital of the town.—The "Ouest" Railway Company has a scheme for a direct route from Havre to the south-west of France, either by a tunnel under or by a large viaduct over the estuary of the Seine.—The monumental group to Testelin, the organiser of the "Défense Nationale" in the north in 1870, designed by M. Cordonnier and exhibited in the last Salon, is to be inaugurated at Lille on the 26th.—The Municipality of Fontainebleau has opened a subscription for a monument to President Carnot to be erected there.—At Montauban last Sunday, the monument to the poet Léon Cladel was inaugurated. It consists of a stele of turquoise-blue marble, surmounted with a bust of Cladel, modelled by M. Bourdelle, and which was exhibited at the Champ de Mars Salon.—The death is announced, at Meudon, of M. Claude Charles Feigé, architect, aged sixty. He was a pupil of Antoine Garnaud, and carried out a number of works, among which may be mentioned the Mont-Parnasse Theatre, the brickmaking works at Vaugirard, and a great many villas, hotels, and business buildings. He was a member of the Société Centrale des Architectes. He had received a military medal in recognition of his conduct in the Franco-German War.

**SOUTH AFRICA.**—We have received the second annual report of the "South African Association of Engineers and Architects," the headquarters of which are at Johannesburg. In the course of his address the retiring President, Mr. Arthur H. Reid, observed, "I am indebted to the courtesy of the Town Engineer for the following statistics of new buildings and reconstructed works that have passed through his office during 1893, and to date, viz.:—Dwelling-houses, 798; business premises, 24; shops, 96; public halls, 5; stores, 81; schools, 1; stables, 71; workshops, 11; churches, 3; magazines, 4; additions and alterations, 116—making a total of 1,210 works, or 100 per month. For this year up to a recent date plans for 368 new buildings and 113 alterations have passed through the department, or a total of 481 works. It is marvellous to me, and creditable to his department, undermanned as it is, to get through the inspection of so many works without accident or complaint. In view of the rapid progress of the town, I would suggest that the Council place their services at the disposal of the Sanitary Board, with the object of producing new and improved building by-laws. The existing ones are practically unworkable, and the new ones are absolutely necessary now. For instance, provision for the escape of inmates and salvage of goods in case of fire, should be made imperative in the immense piles that are now being erected. Access to roofs of all buildings over two stories high should be provided, with hand-rails for safe passage, and the inmates of the upper floors in new ones are cut off from escape by the staircases. A limit to the height of buildings in streets of varying widths should also be fixed. Regulations bearing upon party-walls are most necessary, as the present absurd system of erecting two independent side-walls to each building and wasting 2 ft. or 3 ft. of frontage in double doors, in case the face of the value of land and frontage, continue. I have just successfully carried through the first party-wall contract entered into in Johannesburg, which I reckon saved my client 300l. and 2 ft. in the width of his



frontage, and his neighbour the same. The disfigurement of the streets by huge advertisements has been started, and should be suppressed. The matter of sky-signs also required regulation; and some steps should be taken to curtail the network of overhead telegraph, telephone, and lighting wires now spoiling the appearance of the streets. I should have pleasure in introducing to the Sanitary Board any proposed reforms. We have, during the past year or so, been provided with suitable Law Courts, hospital, market, police, and gaol accommodation, and will shortly have new Post and Telegraph offices, but we still dream of a Town Hall, public offices, fire brigade station, public bath and wash-houses, slaughter-houses, library, churches, schools, a proper water supply, drainage system, garbage destructors, town lighting, and last, but not least, a town clock!"

The retiring President is an architect, and Fellow of the Institute; the new President, Mr. Charles Aburrow, is apparently an engineer, and is an associate of the Institution of Civil Engineers.

### MISCELLANEOUS.

**THE RINGLESS CURTAIN POLE.**—This contrivance, made by the Curtain Pole Company, of Finsbury-circus (G. Smith's patent), is one in which there is an undercut groove in the under side of the pole, in which work a set of metal eyes which hang out of the opening of the groove, and roll in it on small rollers working in the undercut portion of the groove. It is ingenious and simple, and certainly seems likely to work more smoothly than the ordinary curtain-ring.

**THE ELECTRICAL LIGHTING OF A CHURCH.**—The installation of the electric light has just been completed in the Church of St. Martin-in-the-Hill, Scarborough. About one hundred lamps have been used. They have been distributed in three-light clusters in the nave and side aisles. The switching arrangements enable the light to be varied in the whole or any part of the church, as may be required during any portion of the service. The work has been carried out by Messrs. Walker & Hutton, electrical engineers, of Scarborough.

**WINDOW, BOSTON CHURCH, LINCOLNSHIRE.**—Messrs. Powell Brothers, of Leeds, have just completed stained glass for one of the large windows on the south side of this parish church. The window, which is in memory of a local family, contains figures of SS. Peter and Paul as founders of the Christian Church, St. John the Baptist, and the protomartyr St. Stephen. There are also groups representing the work and ministry of these saints, and the whole is in the style of the work done in the early part of the fifteenth century.

**SETTLEMENT OF JOINERS' STRIKE AT HARTLEPOOL.**—The strike of the ship-yard joiners to the number of 400, in the districts of Hartlepool and the Tees, for the same wages as those paid on the Tyne and Wear, after lasting several weeks, was settled on the 1st inst. by the employers agreeing to raise wages to the level of those paid on the Tyne, an advance of about 1s. per week.

**WILSON'S PATENT CRAMP.**—This is a cramp for framing up doors and sashes, with a double shoulder, holding the work with a square grip, and leaving a space between the shoulders or gripping pieces for wedging. It seems a thoroughly workmanlike invention, and is calculated to make good square work. By fitting wooden angle pieces against the metal grips, cut to any angle, it can be made to screw-up mitres, or frames fitted at oblique angles. Mr. J. C. Wilson, of Tooting, is the patentee.

**LADDER-RUNG FIXING.**—Messrs. A. Knox & Son, of Glasgow, send us a specimen of their method of fixing ladder-rungs, in which a circular copper socket is placed on the end of the rung, binding it in such a manner that it can be cut much thinner than usual where entering the ladder-rail, and wedged, without any danger of splitting, and a much less proportion of the rail is cut away for the rung; or in other words, a lighter rail can be used than with the ordinary rung. The rungs can be supplied mounted with the copper socket, in sets, to suit any length of ladder (to avoid the inconvenience and expense in the transit of long ladders).

**SCHOOL OF APPLIED ART, EDINBURGH.**—The second year of the School of Applied Art, which holds its classes in the Royal Institution, Edinburgh, has just been brought to a close. The work done by the students during the past session has been hung in the National Portrait Gallery, and the awards have been decided. An exceedingly interesting and significant collection of work it is (we quote from the *Edinburgh*), and the value of the school may be very well gauged from the class of students who take advantage of it, and by the work they have accomplished. It is not an institution to which anyone will be attracted except a thorough and conscientious craftsman. In its classes there is no toying with art, as seeks to make a workman, whether he be an architect, a silversmith, a glazier, a slater, a mason, a sculptor, a craftsman of the highest order and artist as well. The students receive, one and all, the basis of their teaching an architectural training, and the advantages of this course are demonstrated by the examples of their work shown

upon the walls. The silver chaser and engraver show designs for caskets; the furniture draughtsman, designs for cabinets, tables, or bookcases; the glass painter, the slater, the mason, and representatives of other allied trades all exhibit illustrations bearing upon their respective crafts, in which the ground-work and foundation are purely architectural. Among the students there are architects, apprentices, doing work which in ordinary circumstances they might never have attempted for years. Considering its circumstances, the school has made a distinct advance during the past year, and among the sixty-four students there are very few indeed who do not come up to a high standard. Still, it is handicapped for lack of proper equipment, and the management are at present anxious to provide not only a proper library, but historical collections of casts of old Scottish work, of heraldic work, and of inscriptions to show the transitions of lettering. To do all this requires funds, and they are looking to the citizens for encouragement and support. The following is the list of awards for the past year:

**Class of General Design.—Architectural Designers.**  
—Second Year Students.—First Section—1 and 2, John Stewart and Alfred Greig (equal), 5/1; 3, John S. Syme, Second Section—1, James H. M'Laughlin, 3/1; 2, James H. Rutherford; 3, Hal Wright; 4, Wellesley Bailey; 5, A. Balfour Paul; 6, Alexander Law. First Year Students.—First Section—1, Andrew Muirhead, 3/1. Second Section—1 and 2, James Smith and George Henderson (equal), 1/1. 3, Arthur J. Driver; 4, commended, Edward J. M'Arde. Decorators.—Second Year Students.—1, John M'Isaac, 3/1. First Year Students.—1, James Ballantine, 2/1. Furniture Designers.—Second Year Students.—1 and 2, John D. Trail and John Ednie (equal), 3/1; 3, Wm. Simpson. First Year Students.—1, Robert Reid, 1/1. 2, 3, Masons, Plasterers, Wood-carvers, &c. Second Year Students.—1 and 2, Alexander Kelman and Robert Aitken (equal), 3/1; 3, George Hunter, 3/1. First Year Students.—Commended, John Horne. Silverchaser and Engravers.—Second Year Students.—1, John Hutchison and Thomas Pringle (equal), 3/1. First Year Students.—1, Alexander Reid, 1/1. 2, 3, Colour Class.—Second Year Students.—Morning Class—1, Alfred Greig, 5/1; 2, Hal Wright and John S. Syme (equal), 2/1. 3, 4, commended, Cecil S. Burgess. First Year Students.—1, James H. Rutherford, 3/1; 2, James Ballantine. Evening Class.—Second Year Students.—1, John D. Trail, highly commended, John Stewart; commended, John Ednie. Evening Class.—First Year Students.—1, Andrew Muirhead. Total amount of prizes, 56/.

**STANDARD WAGES IN CONTRACTS AT BRIGHTON.**—At a meeting of the Brighton Town Council on the 2nd inst., Mr. Evans moved to amend the wages clause in Corporation contracts as follows:—"Every mechanic, artisan, craftsman, and labourer employed by the contractor in the course of such contract shall be paid not less than the standard rate of wages in force in this district, such standard to mean the rate agreed upon by the Masters' and Workmen's Associations in Brighton." Mr. Evans explained that the alteration omitted the word "minimum" from before the expression "standard rate of wages" and it also added the last section, explaining the meaning of the standard rate. He reminded the Council that the School Board had already carried a like resolution at the instigation of the Mayor, and he urged that the need for the alteration was that there were frequent attempts made by employers to evade the payment of the standard rate of wages. This was not only unfair to the men, but unjust to honourable employers who paid the full standard rate of wages. He believed the Council would get their reward by having their contracts carried out by competent workmen, and would set a high standard of public morality. In reply to Mr. Broadbridge, Alderman Botting said there was no agreement in the building trade between the masters' and men's associations. Mr. George said that the masters had their own remedy against inferior workmen; they could dismiss them at an hour's notice. Mr. McLean said that they did not insist on old men receiving the maximum wage. Mr. Evans said he wished to omit the word "minimum," because masters sometimes try to mean what they pleased; and he urged that the masters' and men's associations had practically come to an understanding. On its being put to the vote the motion was carried by 21 votes to 2.

**REVERED ST. JUST CHURCH, CORNWALL.**—It is proposed to place in St. Just Church, Cornwall, memorial revered of alabaster and other marbles from the designs of Mr. E. Sedding, of Plymouth.

**PROPOSED ALTERATIONS TO ST. PETER'S CHURCH, EATON-SQUARE.**—At a sitting of the Consistory Court of London, held in St. Paul's Cathedral, on Wednesday before Dr. Tristram, Q.C., Chancellor of the Diocese of London, a petition was presented by the vicar and churchwardens of St. Peter's, Eaton-square, for a faculty to enable them to carry out certain alterations in the church. It was proposed to remove the existing pulpit and to erect a wrought-iron screen with a wrought-iron additions to the south transept and south-east chapel as would enable them to be used as a side chapel in which to place an altar for the daily celebration of Holy Communion. The estimated cost of the

alterations was about 2,000/. The Rev. John Storrs, Vicar of St. Peter's, Eaton-square, in supporting the petition, said that the screen was to be erected between the chancel and the body of the church. It was to have gates. The church was open all day for private prayer. The choir would sit in the chancel as usual, and the gates were to protect the property of the church. The change in the position of the pulpit was necessary in order to avoid the obstruction of the east end of the chancel occasioned by the existing pulpit. The addition to the south transept was for the purpose of enlarging the side chapel and so increasing the accommodation for small congregations attending Holy Communion. The Chancellor drew the witness's attention to a memorial against the petition, which had been signed by Earl Stanhope, Viscount Boyle, Sir Massey Lopes, Mr. Campbell-Bannerman, M.P., and some twenty other parishioners, who expressed the opinion that the proposed screen was unsuitable to the church and would destroy the beauty of the chancel. The witness said that he called upon five of the memorialists, and saw three of them. He found that they had not seen the designs, but had only a general idea that any alteration would be detrimental to the church. Mr. John Samuel Paul, architect and assistant to Sir Arthur Blomfield, who had prepared the plans, said that the height of the screen was 15 ft. to the top of the cornice, and the height of the gates was 3 ft. 6 in. The screen would not, in any way, obstruct the view. The width of the central opening was 6 ft. and that of the side panel 2 ft. 9 in. The screen was not unusually high for the church, which was very lofty. The chancel arch was 30 ft. 6 in. high, and the ceiling was considerably above that. A lower screen would be more obstructive to the view of the congregation. The Rev. J. Storrs said that he had had many conversations with Sir Arthur Blomfield on the subject of the screen. That gentleman was of opinion that the height of the screen was appropriate to the height of the church and that a lower screen would not be so effective. He also said that the height of the screen was necessitated by the position of the pulpit. The Chancellor, in giving his decision, said that the Court was satisfied that it was desirable under the circumstances that there should be a side chapel in this church, and that it would be a great convenience to place a second Holy Table in it. The Court was also satisfied that it was desirable to erect a chancel screen with gates, in order to afford protection to the property left in the church. The only objection to the proposed screen was on account of its height. He thought it was desirable that a screen should be erected for the purpose of protecting the ornaments and other property in the church; but he did not propose to give judgment on that point at present. He should like, before giving judgment, to afford objectors an opportunity of seeing the designs, and should, therefore, defer his decision on the point, so that that opportunity might be afforded with a view, if possible, of coming to some arrangement with those who objected. The faculty for the side chapel would be granted, but he would take time to consider his decision with regard to the screen.

### LEGAL.

#### OBSTRUCTION OF ANCIENT LIGHTS.

In the Chancery Division, on the 3rd inst., the case of the Duke of Devonshire v. Bibbey came before Mr. Justice Kekewich, it being a motion by the Peabody Trustees for an interim injunction to restrain the defendant from erecting a building opposite the block of Peabody Buildings in Stamford-street, Lambeth, erected in February, 1874, so as to obstruct the ancient lights of those buildings.

It appeared that the defendant's old building erected on a 7 ft. strip of land, was originally 17 ft. 6 in. in height, and this had been pulled down and a new building erected of a greater height, not only on the 7 ft. strip, but also advanced on an additional strip of 3 ft., the result being, it was alleged, that the ground floor windows of the Peabody block were darkened.

After hearing the arguments of counsel, his Lordship said that he thought, on the evidence, a sufficient case had been made out for restraining the interference with the plaintiff's lights by reason of the defendant's building on the 3-ft. strip of land. He did not intend to say anything with regard to the building on the 7-ft. strip, except that he did not grant the injunction as to that. The injunction, therefore, would go as to the building on the 3-ft. strip, but that on the 7-ft. strip would not be touched by the order.

Mr. Marten, Q.C., and Mr. H. Wright appeared as counsel for the plaintiffs; and Mr. Warrington, Q.C., and Mr. Gatty for the defendant.

#### ANCIENT LIGHTS CASE AT NEWCASTLE.

In the Chancery Division on Wednesday Mr. Justice Stirling had before him a motion for an interlocutory injunction on behalf of the Co-operative Society of Newcastle-upon-Tyne against the Masonic Hall Company, Newcastle-upon-Tyne, to restrain the defendants from proceeding with the building of a Masonic Hall in High Bridge-street so as to obstruct the ancient lights of plaintiffs' premises.



## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

## COMPETITIONS.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered.
*Improvement of Navigation of River Forth & Clyde	British & Foreign Navigation Co. Ltd.	1000, and 500 5s.	Oct. 31
*New County of London	County of London	2000, and 1000	Nov. 30
*Museum for Antiquities, Cairo	Egyptian Government	First 5000, and 2000	Between the next four Mar. 1, 95

## CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Rebuilding English Baptist Chapel, York	The Trustees	Morgan & Elford	Aug. 14
St. John's and Fitzroy at Grosvenor	Haywood Corp.		do.
Vicarage House, St. Margaret's Church, Bournemouth		J. B. Fraser	do.
New Wing, St. Helier's Convent, H. n. H. n. H.		I. Eltingh	do.
20th, F. n. H. n. H.	York Corp.	A. Greer	do.
*Supply of Road Materials, Carriage, &c.	East Hamlet Valley Local Board	G. W. Brunell	do.
Clock-room	Peckham School		Aug. 15
Chapel and School, B. n. H. n. H.	Peckham School	Morgan & Son	do.
Manufacturing Buildings	St. John's Baptist Church		Aug. 16
Work in a C. n. H. n. H.	Urban Sanitary Auth.	C. C. Dig	Aug. 17
Pumping Engines	Waterworks Com.		Aug. 18
Street Works, Trowbridge	Manchester Corp.	Foley, Son, & Mundy	do.

## CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Hydraulic Pumping Station, Cessnock	Trustees, Clyde Nav.	J. Barnett, Son, & Campbell	Aug. 20
Boiler House, B. n. H. n. H.	Galton	Lambert & Ross	Aug. 21
*Alf. n. H. n. H.	Farman School Board	F. A. Edgar	do.
Classroom, A. n. H. n. H.		J. Jones	Aug. 22
Alterations, Chapel House, M. n. H. n. H.	W. W. D. n. H.	R. Williams	do.
Extens. and W. n. H. n. H.	West. n. H. n. H.	J. Brown	Aug. 23
Sinking a Well	Workman Waterworks Com.	J. Allopp	Aug. 25
Technical Board School, Southampton	S. n. H. n. H.	J. H. B. n. H.	Aug. 27
*Pipe Sewer with Manholes, &c.	Southdown San Corp.	C. T. Copley	do.
*Alf. n. H. n. H.	Dunham Corp.	R. Churchill	Aug. 31
Iron & Steel, B. n. H. n. H.	Town Commissioners	John Layton	Sept. 7
Water Supply Works, L. n. H. n. H.	Com. of H. n. H. Works		Sept. 14
*Post Office, B. n. H. n. H.	do.		No date
Brick & n. H. n. H.	do.		do.
House, C. n. H. n. H.	do.		do.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
Surveyor	Richmond (Surrey) Town Council	3500, &c.	Sept. 19
*Building Engineer and Surveyor	Reading Corporation	3500, &c.	Sept. 19

Those marked with an asterisk (\*) are advertised in this Number. Competitions, pp. iv. Contracts, pp. iv., vii., and xviii. Public Appointments, pp. xvi.

Mr. Graham Hastings, Q.C., who appeared for the plaintiffs, said that the street in question was 28 ft. wide, and his clients had a large building upon one side of the street in which they carried on a printing business. The premises had a large frontage, and their chief business was carried on in the portion of the building fronting the street. Opposite the plaintiffs' premises was a building of 33 ft. 6 in., and defendants were proposing to build a new Masonic Hall from Pilgrim-street to the Reindeer Inn, and to carry it to the height of 66 ft. 6 in. Counsel then proceeded to read a number of affidavits in support of the contention that the proposed building would obstruct the plaintiffs' ancient lights.

Mr. Buckley, Q.C., on behalf of the defendants, opposed the motion on the ground that there would be no material interference with plaintiffs' business; that the plaintiffs' premises were for sale, as they intended to remove to another place of business; and, further, that should they remain the actual business would be materially benefited rather than injured by the proposed new building. Affidavits were read in support of the learned counsel's contention, and his Lordship, in giving judgment, said that, in his opinion, there was a clear case made out for an interlocutory injunction, which he accordingly granted.

## IMPORTANT POINT UNDER THE METROPOLITAN MANAGEMENT ACT.

THE case of the London County Council v. Worley came on for hearing before a Divisional Court of Queen's Bench, consisting of Mr. Justice Mathew and Mr. Justice Kennedy on the 3rd inst., it being the appeal of the London County Council against a decision of Mr. Curtis Bennett, Metropolitan Police Magistrate, refusing to impose penalties under the Metropolitan Management Act, 25 and 26 Vict. cap. 102, Sec. 85, which imposes a penalty of 40s. for every day on which a building is continued of a height exceeding the width of the street, after written notice to reduce it. The ground on which the magistrate had refused to convict was that the proceeding was out of time under Section 107, which enacts that "No person shall be liable for the payment of any penalty or forfeiture unless the complaint has been made before the magistrate within six months after the commission or discovery of the offence." The original offence in the completion of the building above the height allowed (without the leave and license of the Council) was on February 8, 1893. Section 85 enacts "No building shall be erected on the side of any new street of a less width than 50 ft. which shall exceed in height the distance from the front of such building to the opposite side of the street without the consent in writing," &c., "and every person committing any offence under this enactment shall be liable to a penalty of 40s. and in case of a continuing offence to a further penalty of 40s. for every day during which such offence shall continue after notice from the Board."

The facts were as follows:—In April, 1892, there was a notice from the Council to the builder that the building would be an offence, and this notice came to the knowledge of the owner. In July, 1892, the building, which is in Kensington Court, was

roofed in, and the wall was then of the prohibited height, and so the offence of erecting was completed. In October, 1892, there was a penal notice to the builder for the erection of the building above the height limited. In November, 1892, there was a summons against the builder for the penalty for the erection of the building, and the magistrate had a doubt as to whether the case came within the enactment "erected" on the side of a new street, the front being an old street, and the side of the house in the new street.

The case came before the court in June, and the magistrate was over-ruled, and in October, 1893, there was a conviction for the penalty for the original offence—the erection of the building. In February, 1893, the building being completed, the builders withdrew. On March 1 last the Council proceeded against the owner, on a penal notice, in December, 1893, to recover the penalty of 40s. a-day (after the date of the notice) to March 7, 1894. The magistrate thought the proceeding out of time, as being "erected" on the side of a new street, as being, however, stated a case, on which the Council now appealed against his decision.

At the conclusion of the arguments of counsel, Mr. Justice Mathew, in giving judgment, said he had tried to discover a doubt in favour of the builder, but was unable to do so. To his mind the construction of the statute was perfectly clear. The offence charged against the owner was the continuance of the building after the notice, and it was clear to him that the penalties were recoverable. The contention was that the offence could only be continued by the party proceeded against for the original offence, the erection of the building; but that was an erroneous view, and the magistrate ought to have imposed the penalties.

Mr. Justice Kennedy having concurred, the case was remitted to the magistrate, with the direction of the Court that he ought to have convicted.

Mr. Poland, Q.C., and Mr. Horace Avery appeared as counsel for the appellants; and Mr. H. F. Dickens, Q.C., and Mr. Charles Lloyd, for the respondents.

## MEETINGS.

SATURDAY, AUGUST 11.

A. A. Camera Club.—Visit to St. Michael's Church, West Croydon.

MONDAY, AUGUST 13.

Architectural Association. Twenty-fifth Annual Excursion, Wells.

TUESDAY, AUGUST 14.

Architectural Association. Annual Excursion, Wells (continued).

WEDNESDAY, AUGUST 15.

Architectural Association.—Annual Excursion, Wells (continued).

Builders, Foremen and Clerks of Works' Institution.—Ordinary Meeting of the members, 11.10 p.m.

THURSDAY, AUGUST 16.

Architectural Association.—Annual Excursion, Wells (continued).

FRIDAY, AUGUST 17.

Architectural Association.—Annual Excursion, Wells (continued).

Sanitary Inspectors' Association.—Annual Summer Meeting, Ramsgate.

Ingenieurs.—Members leave London to take part in a Meeting at Brussels.

SATURDAY, AUGUST 18.

Architectural Association.—Annual Excursion, Wells (concluded).

Engineering Society.—Summer Excursion, Cardiff and District.

## RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

15,508.—GULEY (Giles): *David L. n. H.*—This invention relates principally to devices for locking the covers of grids. A locking lever, rocking on a hinge pin, is fixed to the end of the box; a projection with a hook at its end is cast on one side and a weighted quadrant at the other. These act in combination with levers, so that the operator has only to let the cover fall into its place, when a tumbler automatically catches in the arm of the cover, and the whole is held securely in position. A key is used to release the tumbler and act as a handle.

15,509.—GULEY (Giles): *Arthur George Bell.*—This introduces into wood doors, incombustible material, so as to give them improved properties, and is effected by making the panels double, so that a central hollow is secured, and is secured by a bolt or the door, and this may be filled with, preferably, asbestos board, or other suitable fireproof material.

15,510.—BUILDING: *Michael Renard.*—The books which form the subject of this patent are formed of fire-lay or other plastic material, which can be moulded into any desired plain or ornamental form, and subsequently hardened by kilning or firing. The patentee also proposes to produce ornamentation by the application of hand tools after the firing is partially effected.

15,511.—WINDOW DRAUGHT PREVENTER: *William Henry Threlk.*—The invention consists of a spring of steel or other material, upon which a pad of felt or other suitable material is secured. A catch is employed to hold the draught-preventer in position.

15,512.—WINDOW SASHES: *James Hall Foster.*—The invention consists of a flanged spring guide attached to the side stile of a window sash, which guides engage within and traverse the side grooves in the frame or casing, thereby excluding rain, wind, dust, &c., and also preventing rattling. The invention also consists of the special construction of the spring guide, whereby they are adapted for use in box-windows having the usual sash weights.

15,513.—FIRE-RESISTING: *Henry Mauer.*—The bricks are formed of a mixture of clay and dung, moulded and pressed in the usual manner. The dung is that of herbivorous animals and is consumed during the burning, and its proportion is varied according to the quality of brick required.

15,514.—SCREW NAIL: *Charles James Polin.*—In order to obtain a nail having all the useful qualities of a screw, the inventor forms it of either square, polygonal, or triangular iron or other metal, with threads stamped, cut, or wrought on the edges only, leaving three, four, or more plain faces, such in fact, as would be obtained by filing four flat sides to a common screw at right angles, leaving threads on each edge and one unthreaded side.

15,515.—APARATUS FOR RAINING, LOWERING, AND SECURING WINDOW SASHES: *William Mackin.*—The invention consists in improvements in the apparatus for the above purposes described in the specification of the patent granted to the inventor in No. 975 of 1893. The apparatus is fitted to the meeting rails of the sashes, and consists essentially of a locking device, and a combination of anti-friction pulleys, spiral spring, &c., and the present improvement has for its object to increase the strength and durability of the previously patented contrivance.

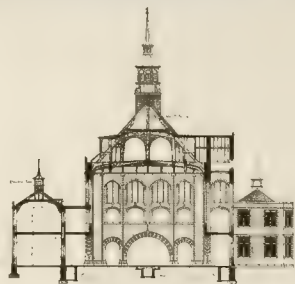




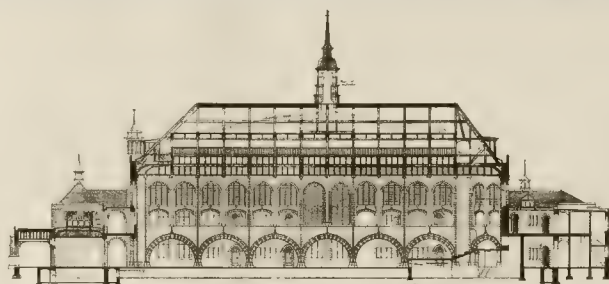
COMPETITION DESIGN FOR CHRIST'S HOSPITAL SCHOOLS. BY MESSRS. PALEY & AUSTIN.  
GENERAL VIEW OF BUILDINGS.







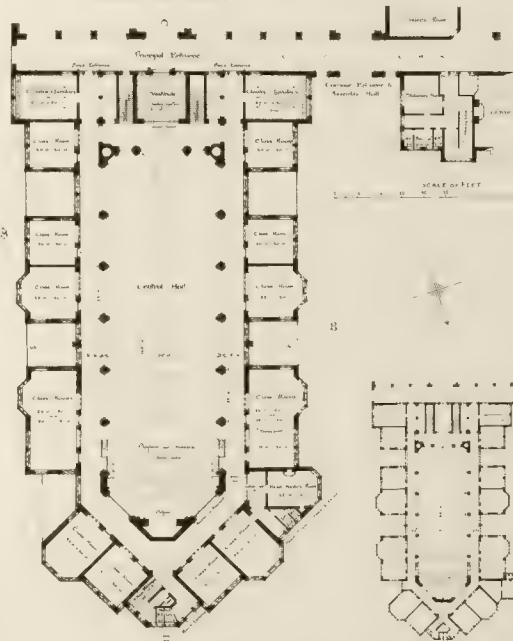
Transverse Section on line A-B



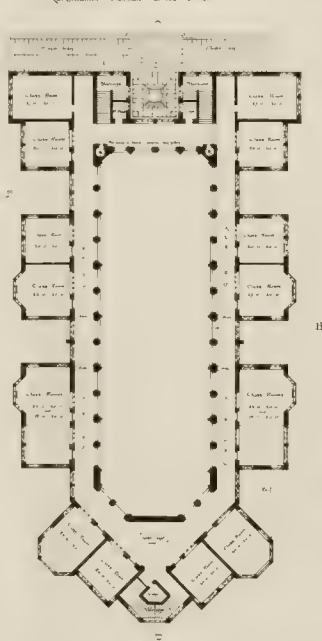
Longitudinal Section on line C-D



West Elevation



Ground Floor



First Floor Plan

# Christ's Hospital Proposed New Schools at Hounslow

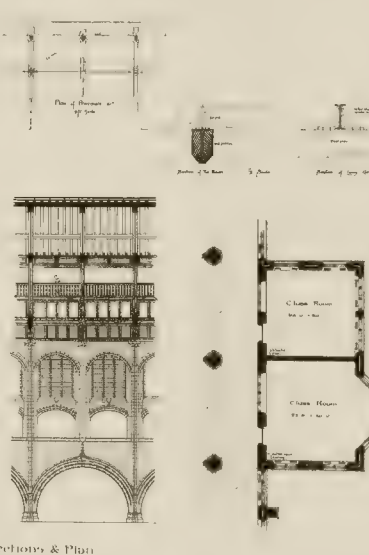
## The Schools

Made to the 1/4 inch scale, after the plan of the 1887 plan  
in part of the 1887 plan



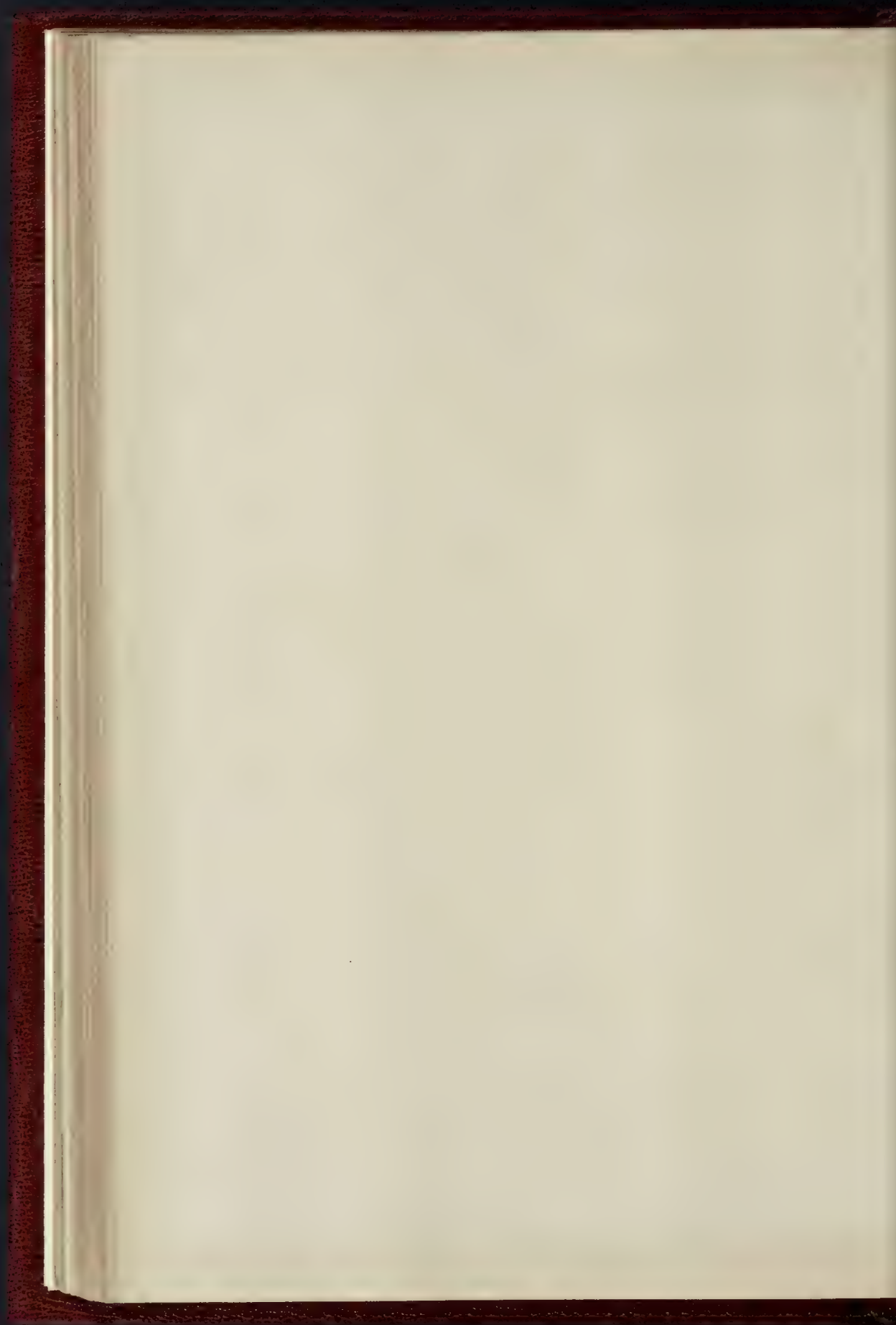
This is one Block A

Transverse Section on line A-B

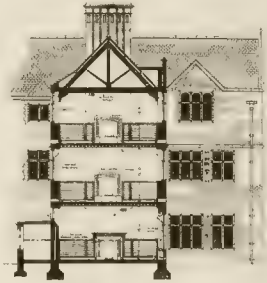


Longitudinal Section on line C-D

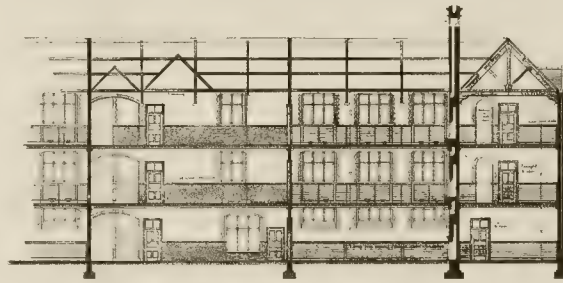
Plan of one Block of Class Rooms



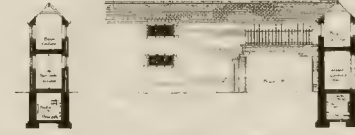
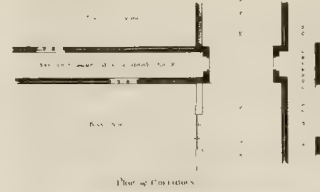




Transverse Section  
see loc. A. B.



Longitudinal Section see loc. C. D.



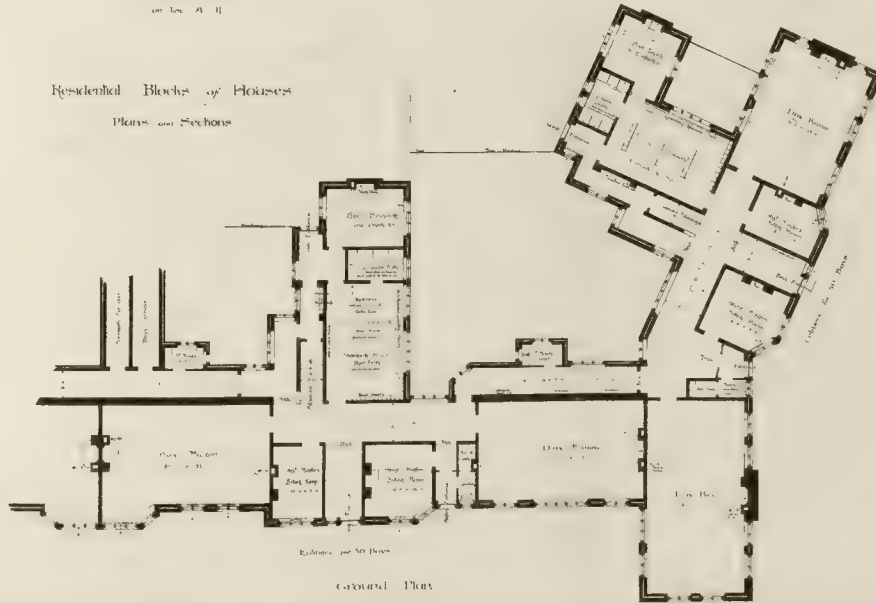
Section of Wall with Window  
Section of Wall with Door  
Section of Wall with Window  
Section of Wall with Door

# CHRIST'S HOSPITAL

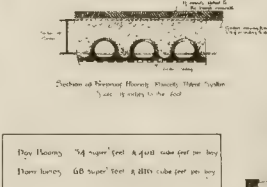
Proposed New Schools - Horsham

## Residential Blocks of Houses

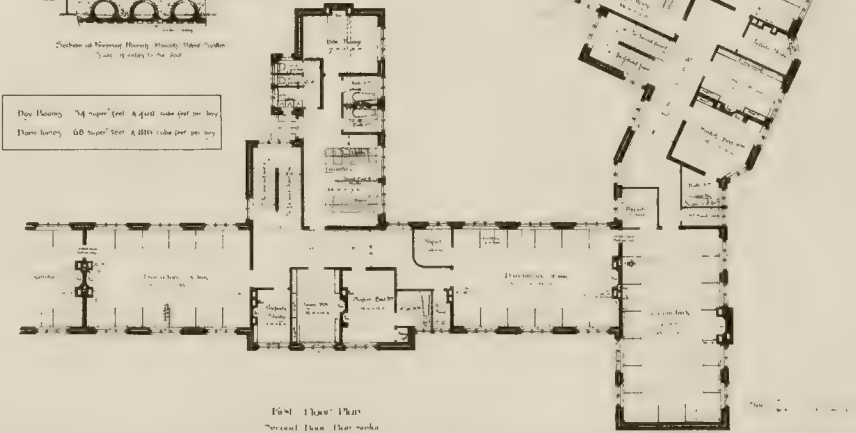
Plans and Sections



Ground Plan



Section of Wall with Window  
Section of Wall with Door



First Floor Plan

Second Floor Plan





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The Architectural Association Annual Excursion:—

Longleat House: Entrance Front and End View

Sketches on the Line of Route.—By Mr. Arnold Mitchell.

Two Single Page Ink-Photos.

Six Single Page Ink-Photos.

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## The Ancient University of Paris and its Colleges.



WHEN an educated Englishman travels on the Continent he is probably more disappointed with the University towns than any other places that he visits. He looks in vain for any

counterpart of Oxford or Cambridge, with their magnificent groups and assemblages of Academic buildings. It is true that here and there he may find some single structure that recalls an Oxford or Cambridge college. If, for instance, his travels lead him to Prague, the classical courts of the "Carolinum" and the "Clementinum" may remind him somewhat of the Quad at Queen's, Oxford. At picturesque Würzburg good Bishop Julius's "Universitäts Gebäude," with its quaint admixture of Gothic and Renaissance architecture, may recall Oriel, or the third court of St. John's, Cambridge. Should he be in Spain, at Salamanca he will find a beautiful old Gothic University building, the work of the celebrated Spanish architect, Juan-Gil de Hontañón, and at Alcalá-de-Henares a splendid Renaissance one, the work of the still more celebrated son, Rodríguez de Hontañón, who, singularly enough, was at the same time building at Segovia the most magnificent cathedral of the latest Gothic, and at Alcalá one of the grandest Renaissance colleges ever erected. None of these, however, remind one of our own ancient Universities, because, granted that they are striking buildings, yet they are but solitary examples; and, to an Englishman's mind, one college can no more convey the notion of a University than one swallow make a summer. He thinks of Christchurch, Merton, Magdalen, and some twenty others, or of Trinity, St. John's, King's, and all their companions, forming grand architectural groups, crowned by spires, domes, and towers. He pictures to himself streets flanked by wide-fronted buildings, and gateways leading into noble courtyards, with lofty buttressed and pinnacled chapels; dining-halls with high-pitched roofs and louveres. Exquisite gardens and groves of stately trees running down to the banks of a clear river. Now none of the University towns we have named can realise this description. But, it will be asked, is not much of this realised at Paris—the most ancient and illustrious of all European

Universities, and one which has played so important a part in modern history? Surely here will be found wonderful architectural evidences of past and present grandeur which must place it, at least, upon a level with the renowned English University towns? Well, let any Englishman, finding himself in the University quarter of Paris, glance around at the various edifices which go to form the external evidences of the existing University—what are they? We will just enumerate some of the most important ancient structures in this quarter dedicated to educational purposes, and contemplate the collection of "architectural glories." First and foremost, there is (or was, for it is now partially demolished) the respectable but dull old Sorbonne, with its dingy courtyard and gloomy chapel; then there is the hideous "Collège de France"; the vast ill-designed workhouse called the "Lycée" or "Collège de St. Barbe"; the substantial, but not beautiful, "Lycée St. Louis"; the "Lycée Henri IV.," which is relieved from architectural insignificance by the magnificent thirteenth-century refectory and tower of the ancient Abbey of Ste. GENEVIÈVE, concealed from external view by modern barrack-like buildings; then there are the Law Schools and the Medical Schools, which, we trust, are practical enough, as nothing has been sacrificed to render them especially beautiful. Should we include the École Polytechnique, which is chiefly remarkable for having invaded the site of the fine old "Collège de Navarre," which it has by degrees shouldered out of existence? It would be too painful to continue this list any further.

The want of grandeur and dignity in the University buildings of Paris is all the more strongly accentuated from the fact that all the old buildings in the neighbourhood are characteristic, and many of them extremely beautiful. The splendid old church of St. Etienne du Mont, the stately Romanesque St. Germain des Prés, the interesting Gothic churches of St. Severin and St. Médard, the lovely Flamboyant Hôtel de Cluny, the stately Renaissance St. Sulpice, the Luxembourg, and, notwithstanding a certain amount of ugliness, even Soufflot's portly bulk of the Pantheon, are all striking examples, and possess those merits which are remarkable by their absence in the University buildings. How the latter must have

\* Of "Lycée Napoléon." It must be borne in mind that the names of the streets and buildings in this part of Paris have been so frequently changed of late years, that it is difficult to know how to indicate them.

deteriorated from what they were in Mediaeval times, and how a single century has sufficed to convert what was once an "Oxford" or a "Cambridge" into a dull, gloomy "education-factory"! It is next to impossible to realise the fact that, on this same spot, formerly stood a series of academical buildings which were unsurpassed anywhere in Europe. Where are they now? What has become of the noble Abbey of St. Victor, the stately Collège de the Bernardines, the exquisite Collège de Cluny, the elaborate little Collège de Cholet, the Collèges de Navarre, de Harcourt, de Lisièux, de Bayeux, and some twenty or thirty others? Of this grand, ancient University what now remains? We can count the fragments on our fingers, for we may almost say, "Perierunt etiam ruinae!" The diligent antiquary may, perhaps, still discover—or, at any rate, he could have done so a few months ago—the old chapel of the Collège de Beauvais, the mutilated walls of the refectory of the Bernardines, a fragment of the little Collège de Mignon, a window or two of the apse of the Collège de Grassines, and a staircase turret of the Collège Fortet. How long the "improvement", loving municipality of Paris will spare these few fragments of their country's history it is impossible to say. Only two years ago their minds were set upon the perfectly wanton destruction of the beautiful little church of St. Julien-le-Pauvre; but the French archaeologists, upon whom seems to have fallen the mantle of the great Lenoir, rushed to the rescue, and prevented the municipality from perpetrating an act which would have covered them with obloquy.

It is really difficult to account for the constant destruction of ancient monuments which takes place all over France, and more especially in Paris. As already pointed out, French antiquaries are enthusiastic and self-sacrificing. The Government appears to be willing to do its duty in preserving ancient buildings, as is proved by the excellent law promulgated in recent years, which declares buildings of special interest "Monuments Historiques." If there is a valuable work of art to be secured, the French Government—whether the Ministry of the day be red, white, black, or neutral in complexion—is generally willing to pay the price required, and they do not, as the English Government did in the "Doigley Chalice" case, plead ignorance upon the subject until the treasure has passed into private hands; nor do they, as is the case here, when an important work upon art is published, insist upon the un-

fortunate author presenting about a dozen copies to various public libraries. The French Government considers that it is assisting art by *paying* for such works, and frequently makes a grant towards the expenses of bringing them out. Some of the clergy are excellent antiquarians, and a short time back, when the writer was dining with a friend of very advanced liberal views, a French gentleman called, and the conversation turned upon archaeology and the Middle Ages. The Frenchman was "most enthusiastic—"Our glorious St. Louis," "that spiritual realisation of religion translated into stone, La Sainte Chapelle," "our inspired Amiens," &c. After the Frenchman had left, the question was asked of the writer, "What do you think that man is?" Well, he certainly appeared to be an enthusiastic Catholic ecclesiologist, but it turned out that he was one of the leaders of the Commune! It is only possible to suppose that the Municipal Council, who are recruited from the bourgeois class (almost everywhere Philistine in sympathies), are to be blamed for all this wanton destruction that goes on.

When the writer visited Paris in 1850, and again in 1853, it was possible to discover remains of many fine old Gothic buildings in the University quarter—degraded, it is true, for the most part to vile uses; but the streets of St. Etienne des Grecs, St. Jacques, Des Carmes, Montagne, De la Harpe, St. Jean de Beauvais, Des Sept Voies, and others abounded in fragments and remains.\* In company with an English antiquary resident in Paris he explored old courts and alleys where there were, amidst dirt and squalor, richly-carved doorways, canopied niches, and delicately traceried windows. Diving down into cellars were to be discovered the remains of vaulted crypts; bases of columns, or in some neglected garden the ruined apse or part of a cloister, told that a college or religious edifice once occupied the spot. Nearly all has, however, disappeared now. The new streets would almost seem to have been planned so as to destroy every vestige of antiquity. The Boulevard St. Michel, the Rue Soufflot, and the Rue des Ecoles have entirely obliterated most of the old landmarks. To their construction is due the demolition of the grand old Commandery of St. John Lateran, with its interesting church, fortified tower, and vast crypts; the Collège de la Marche, de



Collège de Beauvais: in 1853.

Lisieux, and the remains of the Colleges of Montaigu, Cholet, and of the small but interesting fragments of the Jacobins and St. Etienne des Grecs. Of course, the greatest damage was wrought at the period of the Revolution, though the suppression of twenty-

\* The names of most of these streets have been changed, and in some cases the streets themselves entirely obliterated.



Collège de St. Victor: in 1850.

six of the ancient colleges, in the year 1760, may be said to have commenced it, and the years of neglect which followed the overthrow of the Monarchy completed it, when the disused colleges were degraded, their surroundings and the ruins themselves built over with the worst slums of a closely-packed city, the homes of direst poverty, and, too often, veritable dens of thieves and vagabonds; such a rookery, spreading disease and pestilence, both physical and moral, was formed, that we cannot be surprised at Haussmann's desire to sweep it away; but, surely, while removing the slums it was not necessary to have destroyed the fine old buildings—a thorough example of pulling up the wheat and the tares together.

It may be said, what is the good of telling us all this now? Surely it is too late to protest. Perhaps so, but still there are one or two things which might be saved. The beautiful college chapel of St. Jean de Beauvais, for instance, the only Mediaeval college chapel left in Paris. When the writer, in the year 1853, made the sketch which is here reproduced, the building was used as a military store; a few years later it was purchased by the Dominican Order, restored, and re-used as a church. It was, however, closed upon the expulsion of the religious orders by the present Republic, and was threatened with destruction. It is a very pretty example of plain fourteenth-century Gothic, rather reminding one of the general outline of the Ste. Chapelle. Internally, it has a wooden barrel-roof, and, though rather plain, it is very elegantly proportioned. Before the Revolution it contained a splendid monument to the Dormans family, which was removed at the Revolution; one of the effigies now does duty as Héloïse in that Brummagem structure called "the tomb of Abelard and Héloïse," at Père Lachaise. According to Stewart Rose, St. Francis Xavier was at this college before he joined St. Ignatius Loyola at the College of St. Barbe—a portion of which, we believe, still exists, hidden from view by the huge modern College of St. Barbe, which has shouldered out of existence the picturesque old college of Montaigu, where Ignatius Loyola made his classical studies. Erasmus was also at the Montaigu, where he grumbled at the darkness and dampness of his rooms! Views of the old Colleges of

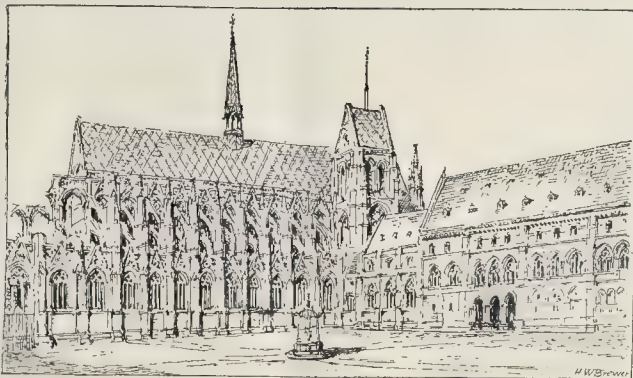
Montaigu and St. Barbe are to be found in Fournier's great work upon Paris, and in Stewart Rose's "St. Ignatius and the Early Jesuits."

The greatest glories, however, from an architectural point of view, of the old University of Paris were the Abbey of St. Victor, the College of the Bernardines, the Collège de Cluny, and the Collège de Cholet. The Royal Abbey of St. Victor stood upon the Jardin des Plantes, at the site of the junction of the Rue Cuvier and the Rue Geoffroy St. Hilaire, near a branch of the Bievre, now filled up.

Some years back the writer remembers seeing some ruins converted into a kind of grotto, which were pointed out as having formed a portion of the Infirmary Chapel of the Abbey, but they are not now to be found. If they have been destroyed, the Abbey of St. Victor has left nothing but a great name. Founded in the time of Louis le Gros (according to Germain Brice) about the year 1113, it became one of the most celebrated monasteries in Europe. The monks were of the order of Canons Regular—an order which seems in the earlier portion of the Middle Ages to have settled in the neighbourhood of Universities. Thus, Osney at Oxford, and Barnwell at Cambridge, both belonged to this order. These religious houses were, in fact, almost as much colleges as monasteries, and we find the canons of St. Victor insisting that the members and students of their houses should be considered members of the University of Paris. In 1308, 1406, and 1499, this claim was reasserted and allowed. All authorities speak with enthusiasm about the Abbey of St. Victor—Le Beuf, Germain Brice in the eighteenth century, and Guilhaume, Fournier and Hare in our own time.

The buildings appear to have been most magnificent. The great church, which stood upon a high ridge of ground, was built nearly north and south. Le Beuf says that it was orientated towards the "Summer Orient;" but the old views and maps of Paris, notably those of Germain Hoyer, Olivier Truschet in 1550, and the Vassallieu Plan 1609, show it positively north and south. It consisted of a long and very lofty choir, with double aisles ending in an apse and chevet, deep transepts, Lady Chapel and very short nave and aisles, a lofty tower and spire at the side of the



*Collège des Bernardins: about 1810.*

choir, and a large porch or narthex at the west end. According to Le Beuf the Lady Chapel, tower, crypt and narthex were coeval with the foundation of the Abbey in 1113, but the rest of the church was rebuilt in 1517. The great Cloister and Chapter House of the Abbey dated from the thirteenth century, the Infirmary Chapel from the fourteenth, and the other buildings from the middle of the sixteenth century. It was so rich in stained-glass that a writer at the time of its destruction says: that the whole history of the art, from its commencement to its decline, might be studied in this one building.

There are several views of St. Victor's in existence. The most interesting is dated 1804, and shows the flank of the church. Another view, from a sketch by Pernot, was published about 1820; but it is of no very great value, as the church was entirely destroyed in 1809. Some portions of the monastery which existed in 1838 are represented in a view by Varini. The sketch here given is founded on these various drawings. The church, cloisters, and infirmary chapel must have been full of grand monuments, as it was not only the burial-place of the abbots, monks, and illustrious members of the University, but also of the Bishops of Paris. (It should be understood that Paris was not raised into an archbishop's see until the seventeenth century; previous to that time Paris was a suffragan see to the Archbishopric of Sens.) Amongst the many eminent bishops buried here, perhaps the greatest was Maurice de Sully, the builder of the greater part of the present cathedral of Notre Dame. The only fragment of any monument, however, which is still to be found in Paris is the gravestone of Adam de St. Victor, in the Mazarin Museum, which bore upon it a striking Latin epitaph which Germain Bryce speaks of as having been St. Victor's own composition.

Not far from the Abbey of St. Victor, just within the old walls of the city, stood another ancient structure, the Collège of the Bernardines. This monastic college was founded by an Englishman, Stephen Lexington, Abbot of Clairvaux, in 1244, but it was made over in 1320 to the Cistercians. The church, or chapel, was erected by Pope Benedict XII., but, unfortunately, the western portion of the nave was never completed, as, before the vaulting over this part was constructed, the money sent over from Italy was stolen. Of the vast buildings only the walls of the east wing remain, and in so modernised a condition that nothing but a great row of buttresses can now be distinguished. When the writer first saw the building in 1853 this refectory, with the dormitory over it, was almost intact, and was one of the finest examples of Gothic architecture in Paris. It was about 240 ft. long and about 50 ft. high. The two upper stories were lit by Gothic windows, the upper range of one light and the second of three lights each. The ground floor was unfortunately buried

up by the ground having been raised; the gable ends had rose windows. The building was so solid that, as Germain Brice says, it resembled a fortress. Unfortunately, Napoleon the Third had it converted into a barrack for firemen, the Gothic windows were blocked up, and the elegant details hacked away. Fortunately, that indefatigable antiquary, Albert Lenoir, made careful measured drawings of the whole, including a large portion of the church, the Chapter House, tower, and sacristy, which existed down to about the year 1830. These are published in Lenoir's great work, "Statistique Monumental de Paris, 1835." There are also some charming etchings of the buildings by Israel Sylvestre and others

about a century earlier. Germain Brice, who hated Gothic architecture, and only believed in buildings which exhibited the Classical "orders" strictly adhered to, could not help being struck by this church. He says: "Ce qu'il y a de plus beau, c'est l'édifice de l'Eglise, construit en 1336, sous le titre de Saint Bernard, que l'on doit considérer comme un chef-d'œuvre de l'architecture Gothique. Les voûtes en sont très élevées et parfaitement bien prises dans leur légèreté. Les chapelles qui regnent de chaque côté sont claires et ont de la proportion avec le reste de l'ouvrage." This church was indeed a magnificent one, and was to the University of Paris what King's Chapel is to Cambridge. Lenoir's measured drawings show it

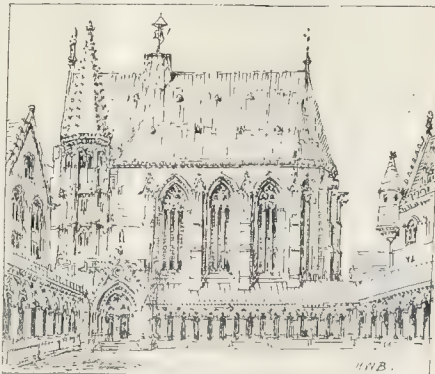
to have been 275 ft. long and nearly 100 ft. wide, and about the same to the crown of the vaulting. It consisted simply of a long nave and aisles bordered by thirty chapels; there was no apse, but a square east-end, like an English church; the whole was vaulted with stone. There was a small tower near the east-end, and all the windows were filled with stained glass. The choir stalls, which were executed in the reign of Henri II., were singularly elaborate. Brice says: "Les grotesques en sculpture dans les panneaux sont d'une invention très ingénieuse et d'un fini parfait." Externally the chapel was supported by pinnacled flying buttresses, and attached to it were a fine Chapter House and Sacristy; the former was connected with the great refectory by a remarkable winding stone staircase, constructed in such a manner that those ascending and descending never met. It was regarded as "a most admirable and curious work."

As the chapel which formed the north side of the court was 275 ft. long, and the refectory and Chapter House, which formed the east side, measured together 290 ft., the Quad must have been about the same size as

Trinity, Cambridge. There are cloisters mentioned, but, as they are not indicated in the views of the great court, there may have been a second court. The whole must have formed the finest college in Europe. The sketch here given is taken partly from an old etching, but the detail corrected from Lenoir's measured plans and drawings.

The Collège de Cluny stood on the south side of the Place de la Sorbonne. It had only one small court, surrounded by an exquisite little cloister; the chapel, the sister edifice to Ste. Chapelle, was not so large, but even more rich in detail and carving. This most beautiful building was spared at the Revolution, and the painter David converted it into a studio. He appears to have taken good care of it. In the year 1834, however, it came into the possession of the Municipality of Paris, and although all the archaeologists, architects, and artists of France appealed to the Government to interfere and save this most perfect example of thirteenth-century architecture, all was of no avail, and the work of destruction was commenced by the demolition of the chapel. The last vestige of the college, a charming little gable with a corbelled-out turret, remained to the year 1848.

Nothing could possibly have excused this work of barbarism; the building occupied quite a small space, but was a perfect example of the very finest development of Gothic architecture. Some very precious fragments of this structure are still preserved in the Hôtel de Cluny—carved bosses, capitals adorned with realistic foliage: wonderfully graceful little rose windows, &c. There are many drawings of the college in existence by Martial, Bonadot, Pernot, and others. The sketch here given is taken from a view made during the work

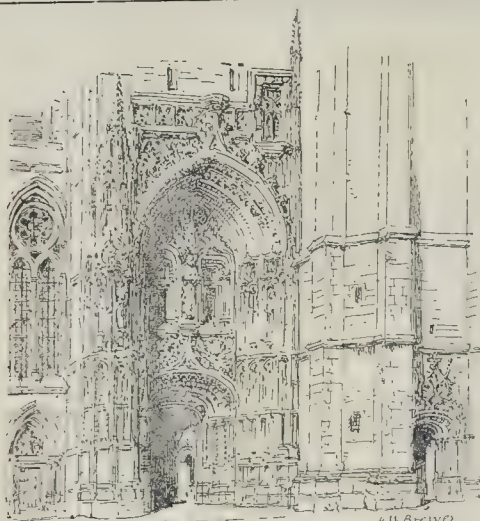
*Collège de Cluny: in 1834.*

of destruction; the graceful flèche or spirelet shown in some of the old plans and views of Paris had disappeared, but the windows and cloister arcades are clearly shown.

Another exquisite little college was that of Cholet. The singularly rich gateway, picturesque tower, and chapel were destroyed in 1818 or 1820. The sketch is from one made at the time of the destruction. One jamb of a large and remarkably elaborate doorway, adorned with Flamboyant tracery and deeply undercut vine-leaves in the hollows, existed in the Rue St. Etienne des Grecs in 1853. This may have been a portion of the Collège de Cholet, but so many fine buildings stood close together in this part of the street that it might also have belonged to the great convent of the Jacobins or the Church of St. Etienne des Grecs, all of which have now disappeared.

A gateway which formed the entrance to the Collège de Navarre, adorned with niches and carving, was pulled down in 1860. A simpler but almost equally beautiful one, which belonged to the Collège de Bayeux, existed down to 1852, and a fine fragment of the great Collège of Cardinal Lemoine, in the Rue Cardinal Lemoine, has only dis-





Gateway and Tower, Collège de Cholet: in 1894.

appeared within the last ten years. It is a matter for congratulation that during all this long period of destruction French antiquarians have made drawings and notes of these noble old buildings. What their feelings were upon the matter may be gathered from the fact that when the Revolutionary mob broke into the church of the Sorbonne to destroy the monument of Cardinal Richelieu, Lenoir threw himself between the pikes of the ruffians and the sculpture, so as to protect the latter with his own body. Though seriously wounded, he fortunately recovered, or we should have been deprived of the finest works upon the Mediaeval buildings of Paris, and Paris itself would possess scarcely a vestige of old sculpture, for, as Hare points out in his interesting guide book, nearly every atom of old sculpture which was saved was preserved through his instrumentality.

## NOTES.

**T**HIS is very unfortunate that Sir James Whitehead, who has for some years taken a most active interest in the railway rates question, should have been too ill to attend the House of Commons during the Committee stage of the Railway and Canal Traffic Bill; but the interests of the trading community were well looked after by Sir Albert Rolit and others. The time devoted to the discussion of the question was really quite inadequate, and the President of the Board of Trade admitted that the Bill, in its present form, was not all that its supporters would have wished it to be. This Bill is the one brought in by Mr. Mundella with a view of empowering the Railway Commissioners to hear and determine complaints as to the raising of rates since December, 1892; but, as was pointed out during the brief debate of Friday last, the wording of the measure appears to effectually sanction all rates previously in force, making the railway companies secure against appeals with respect to them. This doubtless explains the acceptance of the measure by the companies, who have offered no opposition to it at this stage, although they united in describing it at the half-yearly meetings as unfair, unjust, and unnecessary. They have secured the insertion of a clause enforcing the payment by complainants of the charge which would have been payable had the previous rates remained in force; Sir A. Rolit, on the other hand, has carried his proposal that each railway company shall be required to keep all the rate books which were in force before

1893, and to supply copies of extracts upon demand. This will enable the public to verify the advances which were made at the general revision last year. Another useful amendment which was agreed to without discussion, empowers the Commissioners to deal with all advanced charges "whether direct or indirect." It will be seen that this will permit the calling in question of such matters as the withdrawal of the time-honoured custom of carrying 21 cwt. of coal to the ton. Lastly, a new clause was added on Tuesday, giving the Commissioners jurisdiction to decide as to the rebates to be allowed in respect of terminals at sidings not belonging to the Company, the point for which the Mansion House Association have so long contended. The Bill, as it now stands, is admittedly a compromise, and cannot be expected to cover all the points of difference between the railway companies and their customers; but it should be welcomed as going a long way towards settling some of the most pressing of them. Mr. Mundella has expressed his opinion that the changes effected in the measure since he introduced it in his capacity as President of the Board of Trade, have made it a very fair and reasonable settlement of the question, and that it "fairly carries out the recommendations of the Select Committee." But the Bill is scarcely comprehensive enough to have done this, even with the additions which have been made to it.

**T**HE accident (if it deserves that name) at St. Pancras Station is the second which has come under our notice on the Midland Railway from the same cause, viz., driving at an imprudent speed into terminal stations, trusting to the powers of a continuous brake, which generally acts efficiently, but which may fail, as in this case, at a critical moment. The previous accident to which we refer was one which occurred a good many years ago at the Manchester terminal station of the same company, to a train running from Liverpool to Manchester. The result was different in that case, as the train did not live to get into the station, but ran off the line at a sharp curve, calculated only for such low speeds as might naturally be expected in trains approaching a terminus—but the reason was the same; the train was allowed to run up to the terminus at too high a speed; a fault which is unfortunately characteristic of the Midland Railway, on which a system of running up to stations at high speed and depending on the continuous break to check the train at the proper moment, has too much prevailed. Where the

station is not a terminus, an unexpected failure of the break would only result in over-running the platform; where the station is a terminus, the natural result is that which has been so unfortunately illustrated at St. Pancras. The moral of the accident is that greater caution is necessary in such cases, and that a train should only be allowed to approach a terminal station at such a speed that, in case of failure of the continuous break, the ordinary hand-breaks on the engine and guard's van should be sufficient to keep it under control. The Midland Railway Company has now had an unmistakable object-lesson on this point, which will probably be further emphasised by heavy compensation to the injured passengers; and it is to be hoped that the lesson will not be without its practical effect.

**T**HE Road Surveyors in some parts of North Derbyshire are either totally unacquainted with the class of material best suited for road-metalling, or they are sadly ignorant of the available products of their respective neighbourhoods. The month of August, so far, has been very wet in the district, and all roads except those of the first order are in a most deplorable condition—in some cases almost unpassable, for the depth of mud and pools of water on them. The ordinary road-metal used in the district to which we particularly refer, is Carboniferous Limestone, not of the most crystalline description. It appears to be very brittle and easily disintegrable, as might be imagined from the average quality of the material in various parts of the Kingdom. A very few months suffice to convert a road newly metalled with it into a mud-pond, and in one case which came under our notice a road made up only ten weeks since was absolutely worn out. After a spell of dry weather all the ways become very dusty, which renders locomotion exceedingly unpleasant. And all this occurs in a region where road-metal of the most durable kind exists, and in great abundance. An igneous rock, for the most part dolerite, is found in the Carboniferous Limestone area, and may sometimes be seen in close proximity to a limestone quarry exploited for road-metal. This rock, called "toadstone," or "dunstone," is very hard and tough—much more so, we should say, than even the best quality Guernsey stone, and would constitute an excellent macadam. Some varieties of it, it is true, are vesicular, or amygdaloidal, and these may be discarded, but thick beds of close dunstone suitable for the purpose are common enough. On inquiry, we ascertained that the reason the toadstone was not utilised was because it is so hard and expensive to break—a circumstance which we fully anticipated. It may be used as macadam in some parts of the county, but after inspecting many of the roads we have never seen it so employed. Now, it may be objected that the Local Boards and Highway Authorities are responsible for this state of things, and that they are afraid to incur the initial expenditure in making good roads, because their budgets for the time being would be imperilled. This is no defence: any Surveyor, worthy the name, would know that the employment of the superior class of metal referred to could not fail to be the most economical in the long run, and his plain duty is to candidly inform the authorities of this. Yet we find in too many instances that the Surveyor "sides with the Board," instead of fulfilling his duty. Were good road-metal not immediately available there might be some excuse. Many of the roads as they now are are a disgrace to civilisation.

**W**E referred once to the subordinate position which architecture seems to hold in the Vienna "Ingenieur und Architektur Verein," and it is not surprising that the architects of the city have now formed a society of their own, under the title of the "Architekten-Klub," which is supposed



to be the special home of the "Art-Architect," the architects of more "professional" and surveying proclivities being still to be found in connexion with the older society. Herr Andreas Streit will be the first president, and the council includes the names of Professors Foerster, Koenig, and Wielemans.

THE Whitton Park Estate, extending over 115 acres, close by Hounslow Heath, is about to be sold, in parcels, for building purposes. The grounds were laid out over some cornfields and waste of the heath by Archibald, third Duke of Argyll, one of the first to encourage the cultivation of foreign trees and shrubs. Here, in the closing years of George I.'s reign, he planted the fine cedars and firs, and built a tower for his astronomical pursuits, and a conservatory for his once-famed collection of exotics. The conservatory was subsequently converted into a villa; Sir William Chambers bought the house, and built various temples, ruins, &c., about the grounds, somewhat after the mode he adopted at Kew; one of them being a modern temple of Æsculapius, in honour of the Reverend Dr. Willis, after George III.'s recovery in 1789. At Whitton was Cibber's marble group of a Highland piper and his dog, afterwards removed to Stowe. A bas-relief of Zeus and the Titans was carved for the pediment above the main entrance by Dere.

WE hear that the Bishop and Dean of Winchester propose to convert Wolvesey Palace—latterly used for purposes of the Diocesan Training School—into a church-house for the diocese. Wolvesey was formerly the bishops' palace at Winchester; its history carries us back to a time when that city was the capital of England, and a depository of the king's treasure.\* Standing eastwards of the Close, within the ancient wall, and separated from the Precincts by the main stream of the Mill-race or Lock Pond, it is entered from the road which passes from College-street round the Warden's garden to Black bridge across the Itchen. Within its grounds are the ruins of an older palace, known as the Castle, built by Henry of Blois in 1137-8, who used materials of the Conqueror's palace, which he pulled down as an encroachment on church lands. Dismantled by Henry II., the Castle continued to serve as the bishops' residence until overthrown by Sir William Waller. The masonry presents one peculiarity: the rubble wall is bonded by a course of stones, long, narrow, and round, resembling the shafts commonly used for door and window jambs, placed lengthwise through the wall, and having their ends flush with the surface. The bonding stones are of Bin-stead limestone, or Quarr stone, whereof much of the oldest portion of the cathedral is built,† and, it is conjectured, came from the Conqueror's first palace. Of the bishops' palace there are views in Wavell, on the margin of Godson's map, and in Buck's "East Prospect of Winchester" (1736). Over the gateway were set Bishop Fox's arms and name; on the front, an inscription thus—

Georgius Morley, Episcopus, has aedes propriis  
impensis de novo struxit A.D. 1684.

Morley laid out 2,300*l.* for the new building (near the site of the old), whose erection was superintended by Wren, bequeathing 500*l.* more for its completion. In Richard Warner's "Collections" is a view, 1780, of the Perpendicular chapel, 36 ft. by 30 ft., showing how it had been defaced, and changed with a modernised interior; it was formerly attached to the Castle, when the latter served for the bishops' home, communicating therewith by a gallery, 68 ft. by 16 ft., on the first story. In his detailed description of the Castle, Milner directs attention to the unusual neatness of the

pellet ornamentation and triangular fret of some semi-circular arches on the inner face of the big court; a later authority avers that his plan of the fabric, done "ad mentem Jo. Milner" is scarcely correct in its entirety.

THE French Government has just published the particulars of the competition, open to all French architects, for the buildings for the 1900 Exhibition. The designs are to be sent in from the 10th to the 12th of December next. Each is to include a general plan of a half-millimètre to a mètre, a detailed plan of 1-millimètre scale, an elevation of the façade to a 2-millimètre scale, and a bird's-eye view. Liberty is left to the competitors as to the treatment or abolition of every erection now on the site, except the Trocadéro, with liberty to enlarge the latter if desired. Among the new buildings the competitors must provide a Salle des Fêtes, a congress hall, and a hall for the distribution of awards. They must also consider the question of a bridge over the Seine opposite the Invalides, and show the design for laying out the parks and gardens in which the separate pavilions will be erected. The programme also states that the new buildings are to be strictly temporary in character, and that the competitors are to endeavour to realise the best effects in the most economical materials, a leaf taken, no doubt, from the Chicago Exhibition, combined with the experience of the difficulty of knowing what to do with the more solid erection of the last Paris Exhibition.

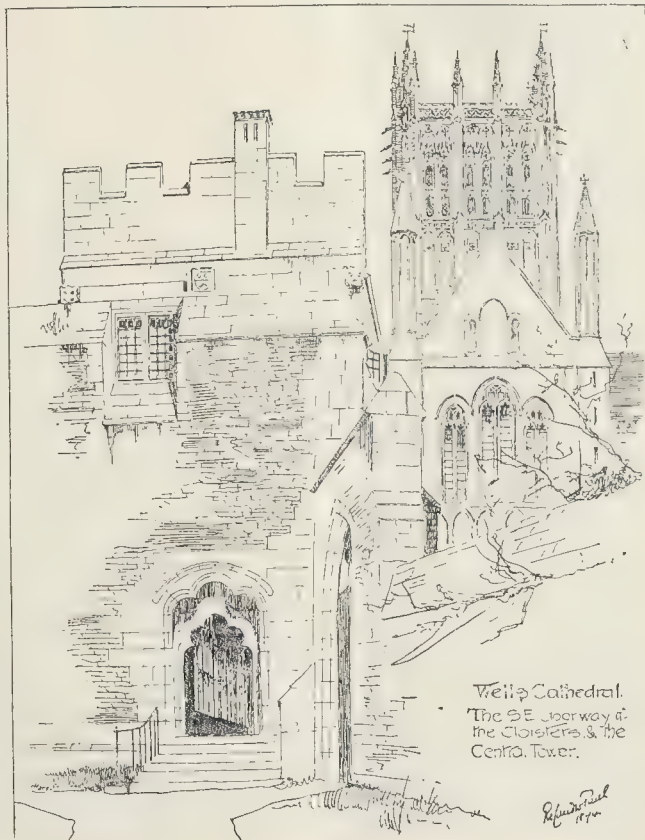
#### THE ARCHITECTURAL ASSOCIATION: TWENTY-FIFTH ANNUAL EXCURSION.

For the twenty-fifth annual excursion of the Architectural Association the cathedral city of Wells is serving as the headquarters for the study

of ancient architecture in the parts of Somersetshire and Wiltshire adjacent. The deficiency of train service from which Wells suffers enforced the arrival on Saturday of all who wished to take part in Monday's programme, but by none of the members was any regret experienced on this account, as a day's rest was almost an absolute necessity, after the wearisome and tedious journey to Wells, before sufficient vigour could be regained to take part in the hard work which forms one of the characteristic and most useful features of these annual excursions. Sunday morning was spent, therefore, in worship and quiet contemplation within and without the cathedral, ever charming, ever fresh, ever instructive. In the afternoon an outing to the natural beauties of the wonderful gorge through the mountain limestone, known as the Cheddar Cliffs, was undertaken, returning to Wells through the picturesque town of Cheddar, where a halt was made of a few minutes for a glimpse of the church, which has a certain amount of interest, chiefly centred in the fifteenth-century pulpit and some pleasantly-designed canopied niches on the jambs of the south transeptal arch and window.

#### Monday.

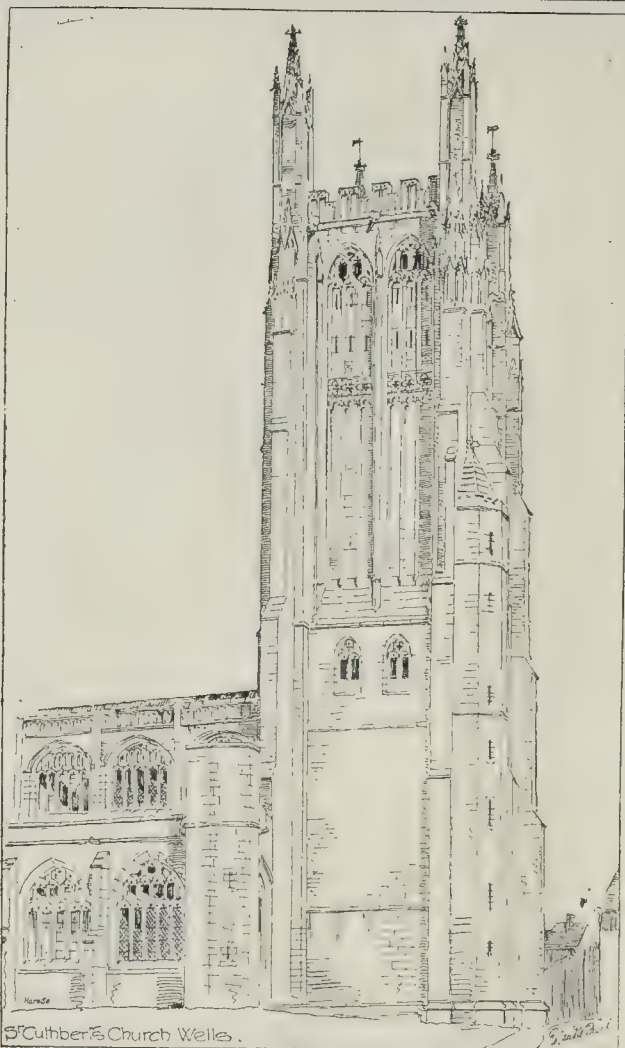
The official programme of the excursion commenced on Monday morning with a drive through some of the beautiful scenery for which this side of Somerset is remarkable, to the village of Croscombe, formerly a market town under a charter granted by Edward I., and still retaining its market cross. The church of St. Mary is comparatively small, but highly interesting, and, indeed, eminent, even in the county of Somerset, for its fine examples of late English woodwork. The nave-roof, the Mediaeval and Jacobean seats, the beautiful pulpit, with the arms of Bishop Lake, and dated 1616, with its sounding-board, and the magnificent Laudian chancel-screen and parclose screens, form a series it would be difficult to parallel. Two fine brass coronas go to make up an interior of exceeding picturesqueness. One cannot but lament, however, that the restoration was not placed in the hands of the late J. D. Sedding, when he was Diocesan



Wells Cathedral.  
The SE doorway of  
the Choir & the  
Centre Tower.

\* See the review in the *Builder*, October 24, 1893, of Mr. Hubert Hall's "Antiquities and Curiosities of the Exchequer."

† Vide Giraldis Cambrensis, and Winchester volume of the *Archæolog. Inst.*



St. Cuthbert's Church Wells.

Architect of Bath and Wells, but was carried out from a specification (?) prepared by some local dignitaries by the simple method of inviting estimates from local builders and cutting extracts therefrom. It is needless to wonder that the cusps were omitted from the restored tracery because they were "not in the specification."

This "restoration" and the plentiful use of varnish to the woodwork have done their best, though happily not too effectually, to destroy the unique charm of Croscombe Church. Without sharing for a moment the views of anti-restorationists, it must be granted that such tamperings with historic monuments and insults to artistic instinct as even the last decade of this century too often thus sees perpetrated by the combined ignorance and parsimony of village magnates are an outrage alike to our patriotism and our intelligence, a disgrace to our country, our civilisation and our age.

The church consists of nave and chancel, with aisles opening into them by five bays of arches on either side. A south porch, a north chantry, with wagon vault and chambers, apparently residential, of two floors at the west end of south aisle are features of interest. In the upper of the two chambers is a carved chest of good design and finer detail than much that exists in the church. A spire is seen on the western tower, a somewhat unusual feature in Somerset churches of the date of Croscombe, which is, as to its present structure, of the latter part of the four-

teenth and the earlier part of the fifteenth centuries.

In Croscombe village is an old inn of fifteenth-century date, with a projecting two-story bay-window, the ground floor of which has a delicately-carved and finely-designed flat stone vault. Tradition says that this was formerly the entrance to the inn, but no architect would credit the tradition after examining the continuity of the window-sill stones.

Opposite this inn on the other side of the small stream which runs through the village is another fifteenth-century house, which, though now subdivided, has apparently originally been a single building of some considerable importance, though to whom it belonged or for what purpose it was intended is not now clear. It may be suggested that it was the home and business premises of a large wool trader or factor when Croscombe's day of prosperity was at its zenith.

Climbing the steep side of thecombe or fort, the excursionists then drove to Chewton Mendip, passing on the way without stopping the remains of a Roman encampment sometimes known as Masbury Castle.

The glory of the church of St. Mary Magdalen, Chewton Mendip, is the exquisite tower, 126 ft. high, of fifteenth-century work, which ranks with Evercech, Bruton, and St. Cuthbert's, Wells, amongst the finest examples of its type. In the perfection of its proportions it is perhaps superior to any of its neighbours. The church has nave,

and chancel, with south aisle to each, and a modern vestry and restored south porch. The north door and chancel-arch are Late Norman, the arcade Early English, with some good carving to the chancel columns and the two western bays coeval with the tower. The sedilia and one piscina apparently are of the same date as the monument behind them, known as the Bonville monument, but as to which some confusion has arisen from the fact that although the tomb may have been executed at the date of the death of William Lord Bonville, son of Sir William Bonville, in 1461, the figure of the knight resting on the tomb does not bear the arms of the Bonvilles, bends, and mullets, but has on the jupon lions rampant, two and one, and on the camail a small shield of St. George, whence it may be inferred that the effigies are those of Sir Henry Fitzroger, who died in 1350, and Dame Elizabeth, his wife, who died in 1388, this knight's arms being gules, three lions rampant, or, whilst the Cross of St. George is accounted for by the fact that this Henry Fitzroger was a tenant in Chewton of land "Pro ordine fratrum sancte crucis juxta turrim London." The figures are considerably short of the tomb in length, indicating that once again the ignorance of local magnates and lay "restorers" has succeeded in falsifying history and inventing puzzles for the learned.

After tea at the vicarage a pleasant drive through some of the charming scenery of the Mendips brought the party back to Wells, well content with the absence of threatened rain and the presence of bright sunshine.

#### Tuesday.

Tuesday morning was spent in a peregrination through the city of Wells, the church of St. Cuthbert being first visited, the interior of which presented an unexpectedly imposing effect from the loftiness of the Early English nave arcade, surmounted by the Perpendicular clearstory and fine roof. The height of the nave-arcade, which, though admittedly unusual, is in its proportions not without parallel, and the apparent difference in the stone used in the upper and lower parts of the piers, have suggested to some that the nave-arcade was heightened possibly when the clearstory was added. This is an ingenious but overstrained explanation, which, although possible, is hardly conclusive. The church of St. Cuthbert has suffered immensely from the wanton mutilation of the magnificent altar-pieces which formerly beautified the ends of the north and south aisle, and we cannot too strongly condemn the careless disposition of the exquisite fragments, of the Jesse tree especially, which are exposed to imminent danger in their haphazard arrangement on the floor of the south aisle, and which, from the perfection of their workmanship and decoration, are worthy of suitable cases, even if it is vain to hope for their restoration to their rightful position.

From St. Cuthbert's the party proceeded to the neighbouring almshouses, founded by and named after Bishop Bulwith, in which, though now somewhat obscured, may be still traced the original disposition, and in which can be clearly seen the chapel and its roof continued westward.

Next the Bishop's barn was visited, some few domestic fragments being glanced at *en route*. The barn, 110 ft. by 27 ft. internally, though of less importance than some others in the neighbourhood, is still of interest and in good preservation, and the visitors were glad to hear that the idea of inserting dormers and enlarging the small windows in order to give more light for its present use as a concert-room and tea-room had been abandoned.

A short stop brought the party to the Bishop's Palace, where were visited the dining-room in the undercroft, the library, Bishop Jocelyn's chapel, and Bishop Burnell's hall, which are too well known to need further description; then crossing the Cathedral green to the new College library, which has been formerly styled the archdeaconry, but of which the original purpose is doubtful. The old roof is in wonderful preservation, and of a high excellence in design, which we regret did not inspire the architect who has carried out the recent refitting to a more worthy and painstaking treatment of the new woodwork that has been inserted.

From the library to the Vicars' Close, in which several of the theological students now reside, was a natural transition, and here first was inspected the hall or common-room erected by Bishop Pomeroy for the corporation of vicars that Bishop Bekynon had founded. The wood paneling, the roof, fireplace, and reader's stall still give evidence of the ancient use and arrangement of the room, though the paraphernalia of a



Wells:  
Entrance to the Vicars' Close



Masonic lodge now lend to it a somewhat different aspect. The chapel at the upper end of the Close is most refreshing and charming, refitted and adorned as it is at the hands of the late J. D. Sedding and Mr. Heywood Sumner, whose sgraffito decoration came as a revelation to many of the members. By the kindness of Mr. Alfred Clarke, who has the good fortune to reside in one of the houses in the Close, the visitors were enabled to see the most perfect example of the ancient arrangement and charm of the delightful residences that make up this famous and picturesque locality.

From the Close the excursionists went to the interior of the cathedral, where the rest of the morning was spent, and whither many returned in the afternoon, which was devoted to sketching, the members of the party being left free to their individual preference in the selection of their particular objects of study amongst the many which they had been shown in the morning. A plan, illustrations, and description of the cathedral series of Wells formed No. 5 of the *Builder* series of Cathedrals of England and Wales, and was published on May 2, 1891.

We shall continue our account of the excursion next week.

#### THE BRITISH ASSOCIATION.

THE annual meeting of the British Association opened, with great *clat*, at Oxford, on the 8th inst., under the presidency of the Marquis of Salisbury.

On Friday, the 10th, when the sections had thoroughly settled down to work, that devoted to Mathematical and Physical science listened to a paper by Lord Kelvin and Mr. Magnus Maclean, entitled "Preliminary experiments to find if subtraction of water from air causes its electrification." The experiments described were performed by blowing ordinary air through a drying tube containing pumice and sulphuric acid, the tube being carefully insulated and screened from external electrification. Ordinary air so treated, raised the potential of the acid by about nine volts, and passed off negatively electrified. A similar effect was observed with chloride of calcium as the drying material, but, on re-

placing the acid by water round the pumice, no electrification could be detected. Hence, the effect was really due to true electrification of the vapour in the air. Other papers dealing with the technique of electricity and mathematics were also read. In the Chemistry and Mineralogy departments Professor W. C. Roberts-Austen presented the report of the committee on an International Standard for the Analysis of Iron and Steel. He announced that the composition of the remaining standard, No. 5, had been determined by four different analysts, and was now accurately ascertained. The standards would shortly be deposited with the Board of Trade. The paper by Professor Clowes, of Nottingham, on the "Proportions of Carbonic Acid in Air which are extinctive to flame, and which are irrespirable," was of great interest as dealing with a problem affecting many industries. It stated that the flames of candles, oil, paraffin and alcohol are extinguished by air containing from 13 to 16 per cent. of carbonic acid. The flame of coal gas requires the presence of at least 33 per cent. of the extinctive gas, whilst the flame of hydrogen requires 58 per cent. It would appear that air containing at least 10 per cent. of carbonic acid more than is required to extinguish a candle flame can be breathed with impunity, but on this point the statements of different observers are conflicting. The vitality of the hydrogen flame in foul air makes it useful for maintaining the flame of a miner's safety-lamp in an impure atmosphere. Dr. Haldane, of Oxford, said that his experiments proved conclusively that air containing as much as 20 per cent. of carbonic acid could not be breathed even for a minute without serious consequences. In the Geological Section, Professor W. Boyd Dawkins made a communication on the probable range of the Coal Measures in Oxfordshire, from which it would seem that since the discovery of coal at Dover, geologists are making strenuous efforts to unearth that useful mineral from beneath the Secondary and Tertiary rocks in localities hitherto unsuspected, or, at any rate, neglected. The Manchester Professor also told us something of an iron ore found in the boring at Shakespeare Cliff, Dover—an oolitic iron, similar to that

obtained from the Corallian rocks of Westbury, in Wiltshire. The Biologists were addressed by their President, Professor Bayley Balfour, on the subject of forestry, and on the necessity of preserving timber-trees, which might have been taken as a foregone conclusion. Mr. Henry Davey, M.Inst.C.E., read a paper before the Mechanical Science Section on "Bore-hole Wells for Town Water Supply," dealing with a system proposed by him at the Cardiff meeting of the Association. He stated that the system had now been carried out at several places, notably at the Netherley pumping-station of the Widnes water-works, particulars being given. Instead of sinking a well 12 ft. to 14 ft. diameter, a long and costly undertaking (especially if soft strata are met with where lining becomes necessary), simple bore-holes are made. Four 30 in. bore-holes can be put down in a very short space of time, much less than is required to sink a 12-ft. well, to accommodate the pumps for duplicate pumping-engines—a pair of pumps to each engine. The bore-holes being completed, the pumps are lowered into them and coupled up to the permanent engines. Immediately that is done, the water found in the bore-holes can be pumped and supplied to the town. Should this be insufficient, a small well would be sunk in the dry to the bottom of the bore-hole pumps. The water being kept down by the action of the pumps, the bore-holes at the level of these latter would be connected to the centre-well and adits driven to collect more water. Of course, should the yield of the bore-holes be sufficient for the purpose in hand there would be no necessity to sink the well. Neither would the system be applicable to many situations, so far as we can see at present. The bore-holes at Netherley, two in number, are sunk in red sandstone rock, and placed 20 ft. apart, each being bored to a diameter of 30 in. for a depth of 200 ft., and to a reduced diameter of 18 in. for a further depth of 200 ft. and 300 ft. respectively, thus making one hole 400 ft. and the other 500 ft. in depth. On the completion of the boring, the water stood 70 ft. to 80 ft. from the surface of the ground, when the quantity pumped by the old engine on the same site was 1½ million gallons per day. The main pumps



were then lowered into the bore-holes, each pump extending to the bottom of the large part of the hole 200 ft. from the surface of the ground. It was found, on the engines working to their full capacity, that 2½ millions of gallons were obtained per day.

On Friday, Professor J. J. Thomson, of Cambridge, showed the Chemists some experiments illustrating the phenomena that accompany discharges of high-tension electricity through gases, and the conditions by which the discharges are influenced. Amongst other things he demonstrated that in moist gases the discharge as a rule starts easily and immediately, but when the gases are dry it takes place either with great difficulty, or not at all. If, however, a brush discharge is caused to pass through the gas the ordinary discharge begins and continues. It is in the starting of the discharge that the presence of moisture has the greatest influence. Professor W. N. Hartley, of Dublin, read a paper on "New Methods of Spectrum Analysis, and on Bessemer Flame Spectra." One of the most important results obtained was that both metals and non-metals may, under certain conditions, give band spectra, and under other conditions line spectra, and the old view that band spectra are characteristic of non-metals and compounds is without foundation. He described in detail the character of the spectrum of the flame of a Bessemer converter at various stages of the "blow," and pointed out the chemical changes to which the alterations are due. "The Chemistry of Coal Formation" formed the subject of a communication by Mr. J. W. Thomas, of Gloucester, but we can see nothing in it of any importance; the chief facts brought out were discovered years ago. Dr. Hugh R. Mill gave the Geographical Section the results of a bathymetrical survey of the English lakes, which are of some interest from the point of view of water-supply. Ten of the largest lakes were sounded, and the volume estimated as follows:—

Name.	Length Miles.	Depth, Feet.		Volume, Millions Cubic Feet.
		Maximum.	Average.	
Windermere.....	10.50	219	78½	12,250
Ullswater.....	7.35	205	83	7,870
Wastwater.....	3.00	258	134½	4,128
Conistone.....	5.41	184	79	4,000
Crummock.....	2.50	144	57½	2,343
Ennerdale.....	2.40	148	62	1,978
Bassenthwaite.....	3.83	70	18	1,022
Derwentwater.....	2.87	72	18	1,010
Haweswater.....	2.33	103	39½	589
Buttermere.....	1.20	94	34½	537

Saturday was a short day in most of the sections, and a whole holiday for the Chemists and Geographers. In the Mathematical and Physical Science section Professor S. P. Langley, of the Smithsonian Institution, read a paper describing his researches on the infra-red spectrum, which bids fair to enormously increase our knowledge concerning the constitution of the sun. Mr. Arthur J. Evans read a paper before the Anthropological section on a "New System of Hieroglyphics and a pre-Phoenician script from Crete and the Peloponnese." He remarked that evidence of the existence of a fully-developed hieroglyphic system on European soil had been hitherto lacking, though recent discoveries had established the fact that in Asia Minor, the pre-historic remains showed intimate connexion with those of the Greek and Thracian lands; a hieroglyphic system had grown up, independent of the Egyptian, to which the general name of "Hittite" had been given. The revelations began by Dr. Schliemann at Tiryns and Mycenæ, and still accumulating, had brought to light, on the soil of Greece itself, a very ancient civilisation, in many respects contemporary with that of Egypt and Babylonia. During a visit to Greece last year, he (Mr. Evans) had obtained a clue to the existence of a peculiar kind of seal-stones, the chief find-spot of which seemed to be Crete, presenting symbols of a hieroglyphic nature. This spring he had renewed his researches in Crete, and the result was the discovery of a series of stones presenting pictographic symbols of the same nature, so that he was now able to put together over seventy symbols belonging to an independent hieroglyphic system. Further, he had discovered, partly on stones of similar form, partly engraved on prehistoric vases and other materials, a series of linear characters, a certain proportion of which appeared to grow out of the pictorial forms, and these were described in detail.

On Monday all departments were busy. In the section of Mathematics and Physics many papers were read, amongst them one by Professor Mayer

on the "Variation of the Modulus of Elasticity with Temperature." Professor Ewing described an instrument for measuring small strains, applicable to structures in position; it will measure either thrust or pull. This is a most useful invention, and will doubtless be largely taken advantage of in constructional work. It consists of two cross-pieces, which can be attached to the test-piece by means of pivots. One cross-piece carries a microscope, and the other has a mark sighted by the microscope; the two cross-pieces are arranged so that only a separation of their pivots can alter their positions—they form a jointed system. A longitudinal strain amounting to the one-hundred-thousandth part of an inch can be measured by the instrument. The other papers were mainly concerned with magnetism and electricity in their theoretical aspects. The Chemists were deeply interested in a communication from Lord Rayleigh and Professor Ramsay, announcing the discovery of a new gas occurring in the atmosphere. In the discussion that ensued, Professor Roberts-Austen suggested that this gas might be the one which is frequently found as a residue among the gases extracted from steel. The section of Economic Science and Statistics had, amongst other papers, one by Mr. Sidney Webb on "The Alleged Economic Heresies of the London County Council." He said that the policy of the Council has been criticised, from the point of view of economic science, mainly under three heads. Instead of buying its labour in the cheapest market, it has, from the first, striven to adopt as its standard the trade union rates of wages, and to assert a "moral minimum" of earnings, below which it was inexpedient that any London citizen should be allowed to sink. Moreover, not content with proceeding on these lines as regards workmen whom it directly employs, it has sought throughout to secure that all contractors executing its work should adopt the same principle. Finally, it has endeavoured, wherever possible, to dispense with the middleman *entrepreneur*, and to substitute salaried supervision and management directly under public control. On all three of these points its action is largely influencing public opinion. He therefore thought it desirable to set forth precisely the facts and to reconsider the economic position. This he did in a paper of some length, which we need not discuss in its entirety, as the chief facts are well-known to our readers. The communication was practically a defence of the Council's policy. Mr. Webb remarked that with regard to the Council's determination to dispense, wherever possible, with the contractor, and to execute its works by engaging a staff of workmen under the supervision of its own salaried officers, this had been fiercely attacked as being palpably and obviously opposed to political economy and business experience. He showed by figures that there had been a saving of 2,420*l.*, or 12·33 per cent., in the first sixteen operations carried out by the Council without a contractor. Mr. Webb also justified the principle of competition. In the discussion, Mr. Bond said there was an impression abroad that the London County Council overpaid their unskilled workmen, and underpaid the most highly-skilled. The Council might do better than endeavour to master the details of every trade, and he disapproved the rigid adherence to trade union wages. In the section of Anthropology, the "Lake Village at Glastonbury" (referred to last year) formed the subject of a report. It appears that the work of excavation has been much retarded by floods, but many interesting facts have been brought to light.

On Tuesday all sections were equally busy. In the section of Mathematics, amongst other things Professor Oliver Lodge described some experiments to illustrate Clerk Maxwell's theory of light. In the Geological section the twentieth report of the Underground Water Committee, drawn up by the Secretary, Mr. De Rance, was communicated. It was stated that an abstract of the previous nineteen reports will be ready for separate publication this year. The Geographers were interested in a paper by Mr. Somers Clarke, dealing with that part of Lower Nubia which will be flooded by the proposed Nile reservoir. He urged that, in view of the contemplated destruction, it is of the utmost importance to make an exhaustive scientific investigation of the valley before it is submerged. In the section devoted to Mechanical Science, Professor Unwin brought up the report of the Committee on Dryness of Steam, and many interesting papers, though not quite within our province, were read.

On Wednesday, only four sections assembled,

the others having exhausted their programmes. The business, as is usual on the final day, consisted principally of votes of thanks to the Corporation, &c. The meeting next year will be held at Ipswich.

## Illustrations.

### LONGLEAT HOUSE.

LONGLEAT has often been adduced as a typical example of a fine Elizabethan mansion, but it can hardly be held to be really such. It is, of course, fine even to magnificence, but it is not typical. In the first place, it was so completely altered in regard to its plan by Jeffrey Wyatt early in the present century, as to have lost all pretence to represent an Elizabethan mansion—in fact, it is practically only the south and east fronts (of which we give illustrations) that retain any considerable amount of the original work. Then, secondly, the disposition of its features, its length of horizontal lines, its straight fronts broken only by the square bays, and its very pronounced symmetry, although they combine to render it stately, remove it from the ranks of those picturesque, half-Gothic, half-Classic houses which are so characteristic of Elizabeth's time. There is rather too much Italian feeling about it for it to be typically Elizabethan. Yet it is fully Elizabethan in date, and is a tolerably early example. It was begun in 1567 by Sir John Thynne, from whom the present owners are descended, and took at least eleven years in building, as is evidenced by the book of building accounts, still preserved, which commences on January 21, 1567, and terminates on March 29, 1578. During that time 8,016*l.* 13*s.* 8*d.* was spent, and all the items to the various workmen are duly entered.

It is not known who the designer was. John of Padua has been credited with the work, but, so far as we know, upon no better authority than mere conjecture. John Thorpe, too, of course has been mentioned, but there is no evidence either among his plans, or at Longleat itself to confirm this view. Finally Robert Smythson, who was concerned with Wollaton, has been suggested. The building accounts do not help us much in this connexion. No Robert Smythson appears in them, but a Richard Smythson does, who received 16*d.* per day. The head mason's name was More, but in the same year in which the accounts begin, *i.e.*, 1567, a Robert Smythson is said to have been sent to succeed him; but no one has yet reconciled the discrepancy in the names of Robert and Richard; and the share of either of them, if there were two, has yet to be determined. The field of conjecture in these matters is very wide, but there is this to be observed, that in certain respects Longleat and Wollaton are alike. They are both characterised by stateliness rather than picturesqueness; they both have a feeling of squareness, and the detail of the windows and the cornices is of the same kind, though not by any means precisely alike. It would not be extravagant to imagine them the work of the same mind, but the difficulty in these cases is to obtain any real tangible evidence upon which to work; possibly a comparison of the building accounts of the two houses might throw some light upon the question, but there would be some difficulty in looking at them actually side by side. It may also be remarked that the Sir John Thynne who began the house died in 1580, in which year Wollaton was begun, so that it would be quite possible for the clerk-of-works from Longleat to have gone to Wollaton on the death of his employer.

In another respect the two houses are alike, and that is in the circular niches containing busts, which are placed under the windows of the bays. Such niches frequently occur in buildings of the time, but hardly in such abundance as at Longleat and Wollaton. They represent, of course, some classical personage, a philosopher, or poet, or soldier, or one of the Nine Worthies—perhaps Pomponius the Great, as Costard calls him in "Love's Labour Lost." At Montacute the Nine Worthies stand in niches, complete from head to foot—here, whoever is represented has but a bust, and so, too, at Wollaton, where among those which are named are Virgil, Aristotle, and Plato. At Longleat none are named.

The work, which was begun by Sir John Thynne, was continued by his son, who caused the finishing touches to be put, such as the balustrade, the chimneys, some of the towers, and the screen and woodwork in the hall. It is not improbable that the recent flat, straight balus-







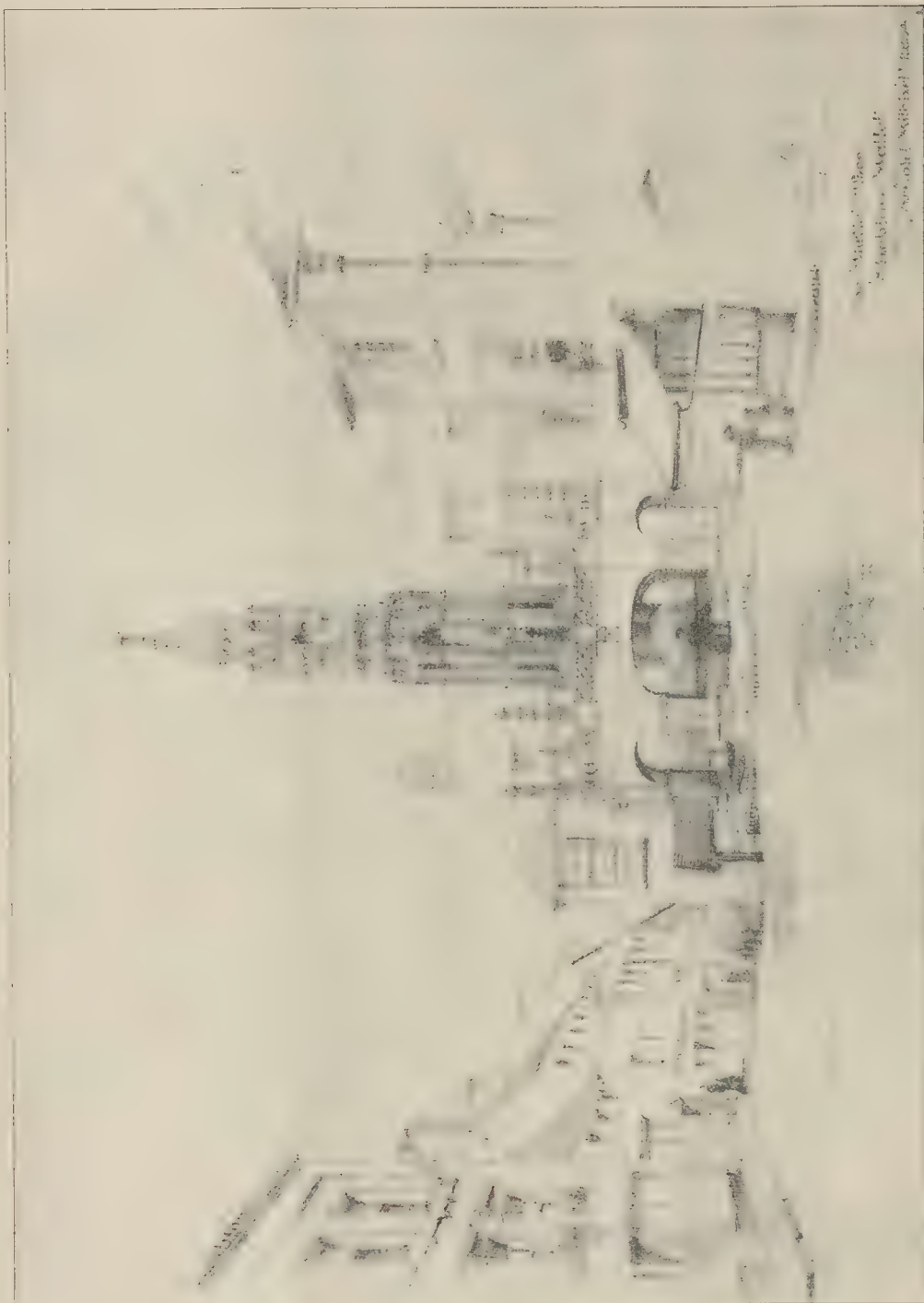
Benedictine (Italy).

Palace of the Emperor.

Arnold Mitchell  
3894







St. Martin's Church  
St. Martin's Church  
St. Martin's Church





THE BUILDER AUGUST 18 1894



LONGLEAF HOUSE ENTRANCE FRONT







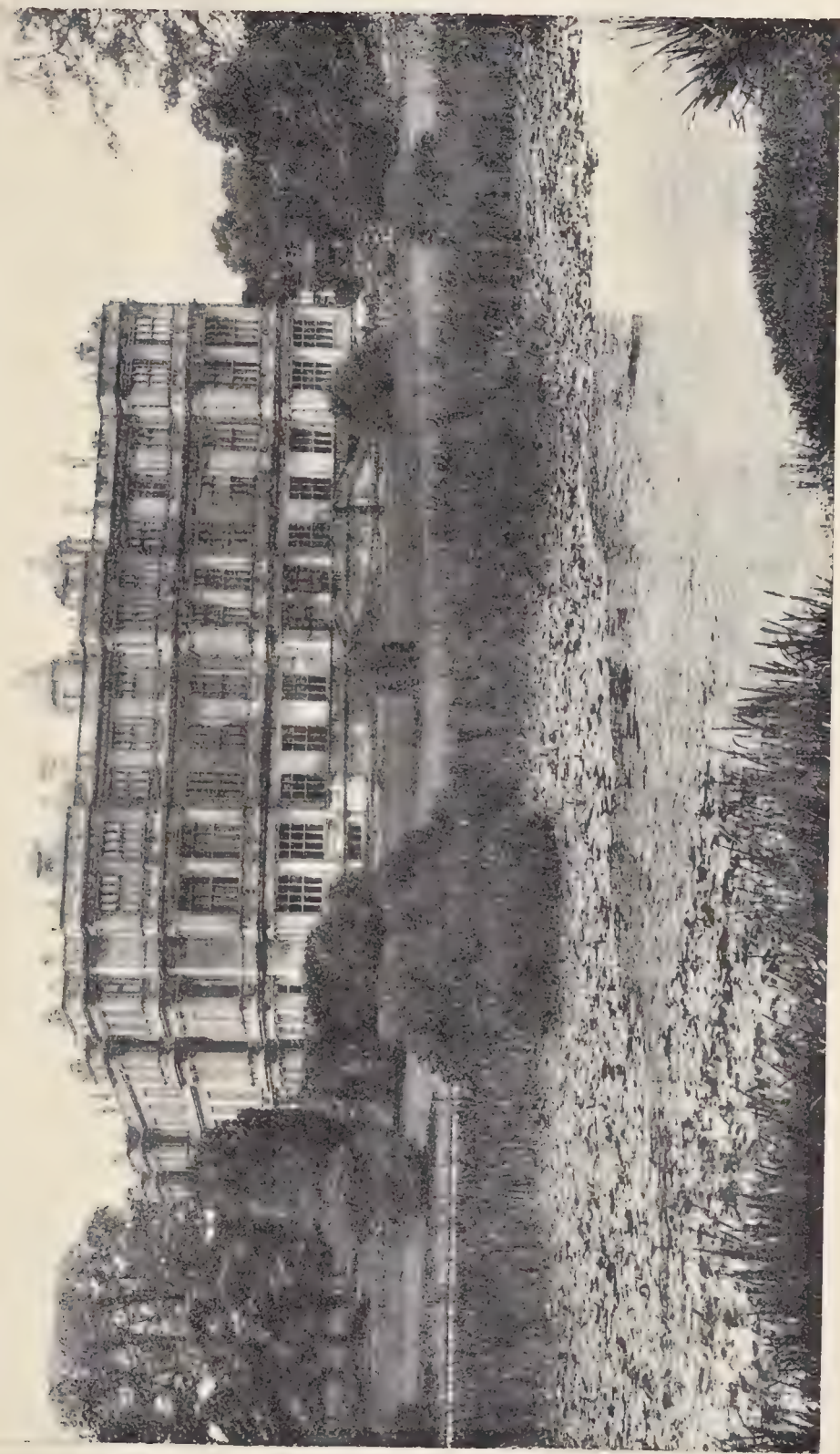




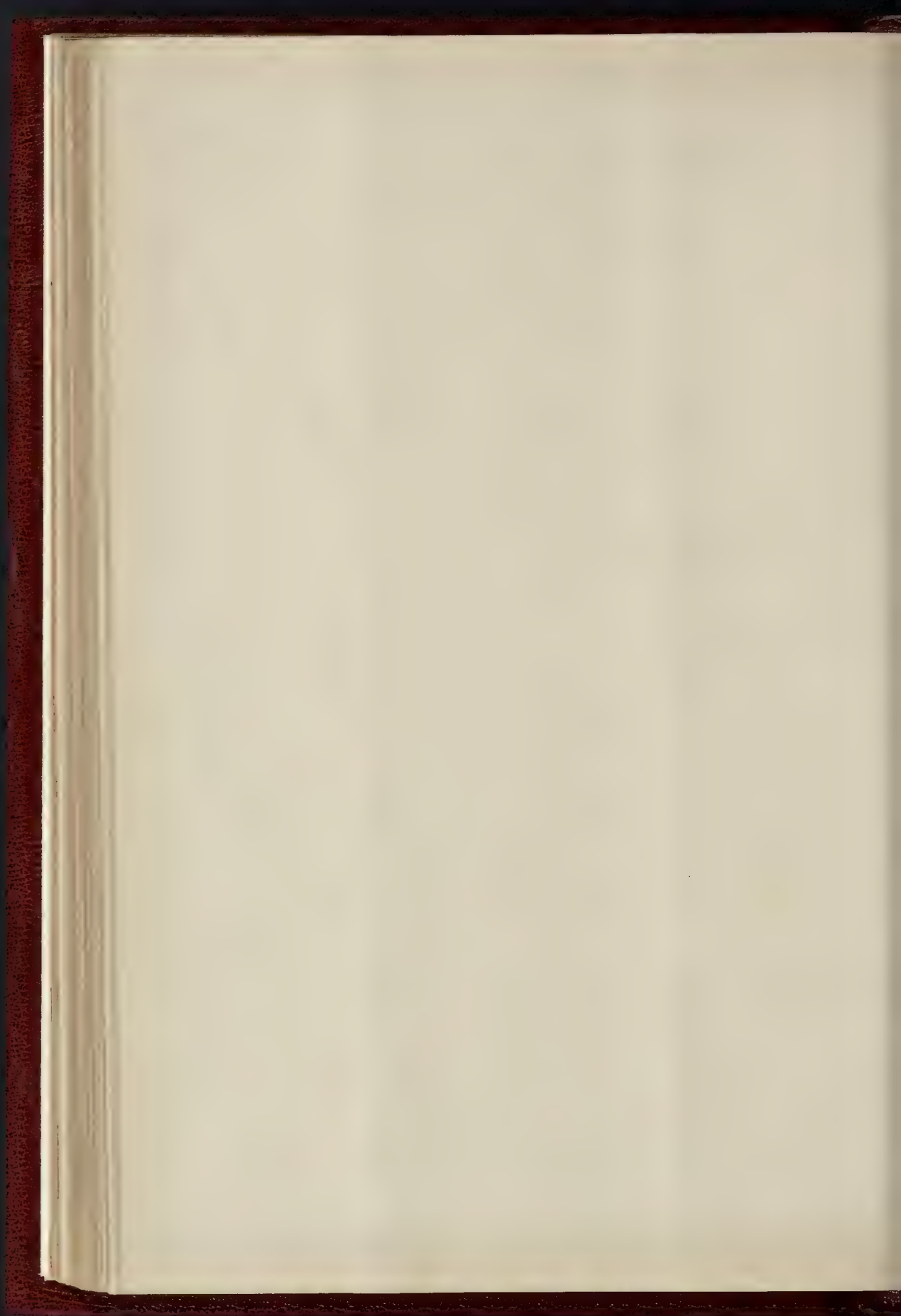
ARCHITECTURAL ASSOCIATION EXCURSION: SKETCHES ON THE LINE OF ROUTE.







LONGLEAT HOUSE - END VIEW







INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

ARCHITECTURAL ASSOCIATION EXCURSION: SKETCHES ON THE LINE OF ROUTE.





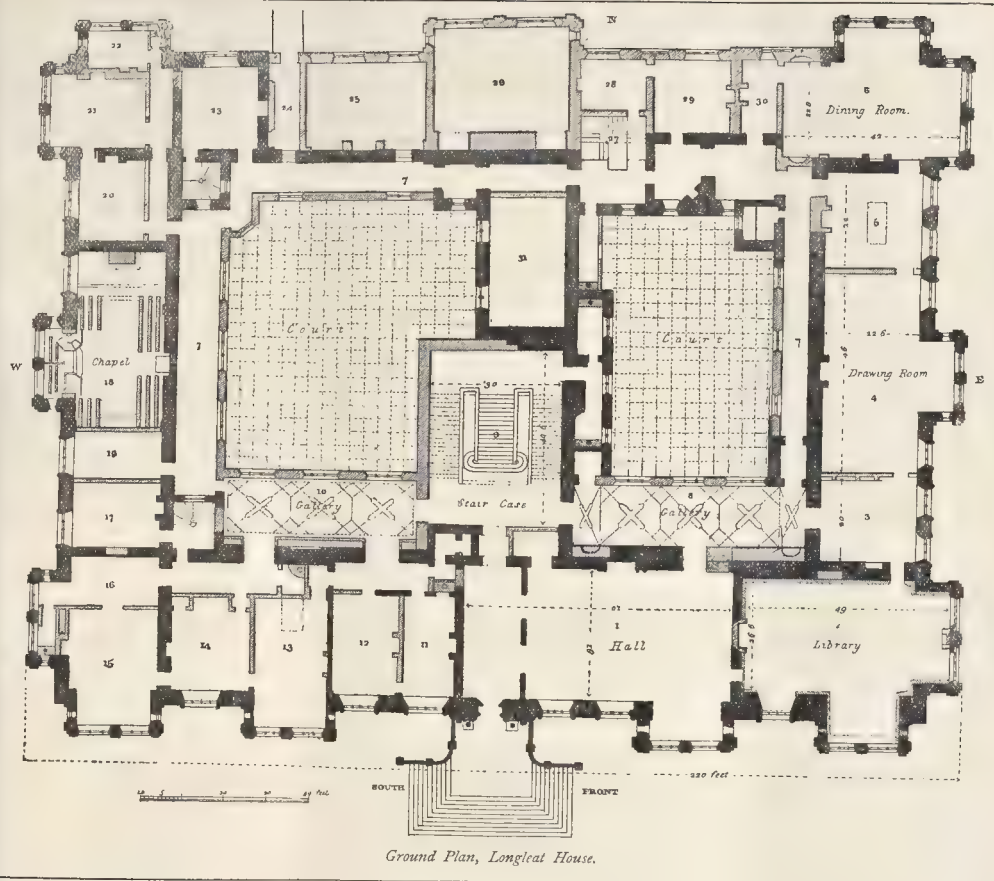


BY PHOTOGRAPHY BY A. L. LANTIER. SET LETTER BY J.

ARCHITECTURAL ASSOCIATION EXCURSION: SKETCHES ON THE LINE OF ROUTE







Ground Plan, Longleat House.

nde may at one time have been broken by ables, and the roof, too, may have been visible; it would have been in accordance with the work of the time if it were so; but there may be an old print extant which would settle these points. At any rate we know enough of Jeffrey Wyatt to believe that he would not scruple to make even the most radical changes to suit his purpose, and he did not hesitate to obliterate history where he thought it necessary. We can hardly complain of changes in the plan. If houses are to continue as homes, they must be altered to suit the requirements of succeeding generations; but the propriety of altering the external appearance, merely for the sake of gratifying one's own particular tastes, may well be called in question.

To return to the point whence we started; while we may well admire the stateliness of Longleat, in spite of (or, if preferred, in consequence of) what Jeffrey Wyatt did to it, it would be misleading to regard it as a typical example of Elizabethan architecture.

#### ARCHITECTURAL ASSOCIATION EXCURSION: SKETCHES.

THESE sketches, which were made by Mr. Arnold Mitchell, are given as reminiscences of picturesque bits in the places visited during the annual excursion of the Architectural Association, which has taken place this week. Most of them will be referred to in the articles descriptive of the excursion, in this and the following week's issue.

APPOINTMENT.—At a meeting of the Heston and Isleworth Local Board, held on Tuesday last, Mr. J. H. Strachan, of Brentford, was elected to the vacant position of Engineer and Surveyor, at a salary of 400*l.* per annum. The following were selected from the applicants to appear before the Board:—Hume, Hounslow; Laffan, Twickenham; Strachan, Brentford; Flower, Assistant-Surveyor, Hounslow; Marston, Sutton Coldfield; and MacBriar, Lincoln.

## Correspondence.

To the Editor of THE BUILDER.

### ARCHITECTS' CERTIFICATES.

SIR,—The only purpose, we take it, which was originally intended to be served by an architect's certificate, was that of certifying that the work done by a contractor had been completed in a satisfactory manner.

During the last two or three years, it seems to us, a custom has grown up of making the certificates serve another purpose, which in our opinion is very unfair to the contractor; that is to say when, for any reason, the customer is unable or unwilling to make payment, the architect's certificate is withheld, and in its absence under the conditions of many contracts the contractor is of course powerless to take legal proceedings, or at the very best he runs a considerable risk of failure.

During the present year we have had not less than five cases in which certificates have been withheld. In none of them was there any dispute as to the work not having been finished in a satisfactory manner; had this been otherwise, there would of course be no point in our dispute.

1.—In the first instance the architect distinctly told us, in confidence, that the company employing him had directed him to issue no more certificates till they had funds in hand to meet them.

2.—In the second case the customer repeatedly expressed his willingness to pay as soon as we got the certificate; the architect did not refuse in so many words to give the certificate, but he did not reply to our letters and was always out when we called. In this instance, as we had not the slightest evidence of collusion, although, of course, we could not but suspect it, we could do absolutely nothing.

3.—In the third instance the architect promised to issue a certificate if we would give him a commission, and upon our declining to do this he took no further notice of our requests.

4.—In the fourth case the work was done in a very great hurry and at much inconvenience to ourselves, the architects were an old-established and most respected firm.

They did not refuse the certificate, but delayed

from time to time, until six months had elapsed, when it was issued. When we produced the document, we were informed that the proprietors of the building were in liquidation, and that an application had been made for an order of the Court restraining creditors.

5.—In this instance, the only one of the five in which there was a dispute of any kind, a question arose in connexion with a trifling sum charged for extras. Owing to this the architect refused a written certificate of the completion of the contract, although he stated he would issue one as soon as the account was adjusted. The proprietors, however, refused to pay anything owing to the certificate not being issued. In this last instance we shall probably succeed in getting our money, but nothing could be done in regard to the other four, and our purpose in writing is to ask your readers if they are experienced in similar difficulties in connexion with architects' certificates.

We do not wish our names to be published for the present moment, for obvious reasons, but you, Sir, will be able to confirm the fact that we have been many years in business. Down to recent times we have never experienced any difficulty, and it seems to us that a new custom must be growing up on the part of proprietors of buildings of requesting architects to withhold certificates for financial reasons only. If this is the case, we think that concerted action by a few of the larger firms would be of service. Unless our own experience is unique, we are of opinion that it is absolutely necessary that something should be done in the matter, unless contractors are content to submit to considerable losses.

When a shaky United Company is the customer, a delay in certifying for the work done is often an effective weapon in defeating the contractor.

"MECHANICAL ENGINEERS."

### SEWER VENTILATION.

SIR,—Exception having been taken to my criticism of the sketch published in the *Builder* of July 28, I should like to say I quite agree with the principle of admitting air as low as possible within the bounds of practicability. What I desired to point out was that as shown in the sketch the air-inlet would frequently be covered by the sewage—not necessarily permanently stopped up as your correspondent seems to have understood me—and the admission of

air prevented, and that the best position for the opening, under the circumstances, would be at the crown of the sewer.

With reference to the position of air-inlets in the chambers of house-drains as referred to, it is sometimes desirable to admit air at the top of the chamber; as, for instance, when the soil-pipe, acting also as ventilating-pipe, is at the head of the drain, and is connected by a length of drain to the chamber, but the method of connecting what is practically the anti-syphonage pipe into the chamber, as shown in the last issue of the *Builder*, is—apart from the better ventilation afforded—worthy of universal adoption. It will frequently be found that the value of the anti-syphonage pipe is greatly enhanced by so connecting it.

With reference to the desirability of ventilating sewers at all, which has even been combated by a recent correspondent of the *Builder*, the following quotation from a speech by Dr. Angell, at a discussion on "Sewage Disposal," at the Institute of Civil Engineers, in 1887, is very much to the point. Adverting to the possibility of controlling the nature of the fermentation in sewage, the speaker said: "If the sewage was well aerated before, during, and after treatment, it would be certain that the microbe life assumed that form which produced the least objectionable by-products. . . . In sewers it could be determined which party of microbes should continue to do its work—whether by thorough aëriation, the least objectionable, or whether the lowest possible forms, the putrefactive or vibronic." August 15, 1894.

HARRY G. ASSITER.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—VII.

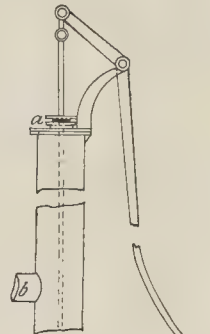
#### VARIOUS FORMS OF PUMPS.

THE force acquired by steam or other motive power may be applied through the medium of a pump in three ways—firstly, by suction or lifting; secondly, by forcing; thirdly, by a combination of the two systems, lifting and forcing.

The suction or lift pump (Fig. 3) is of common application for domestic supplies from wells or boreholes. It consists essentially of a cylinder or working barrel, with a suction-pipe at the lower end, at the top of which is a valve, technically called a "clack." The delivery-pipe or rising main is attached to the upper end of the barrel, and through it a pump-rod with a valve or bucket attached to its lower end is worked up and down in the working barrel. The upward movement of the bucket withdraws the pressure of the atmosphere from the surface of the water inside the suction-pipe, and the pressure of the atmosphere on the surface of the water in the well forces the water up above the clack, or to such a height that the pressures on either side of the pipe are in equilibrium. The water retained by the clack passes through the valve at the lower end of the pump-rod as the latter moves downwards, and is raised at each successive stroke until it reaches the top of the rising main or delivery-

pipe, which in open-topped pumps is the top pump-tree or pipe. In small pumps, where the pump-rod works through a stuffing-box or gland (Fig. 4), the water can be raised to any required height, but for economical reasons it is not advantageous to lift it higher than 30 ft. above

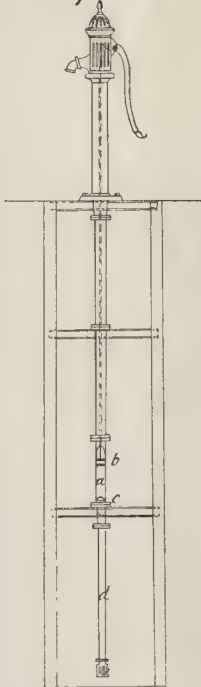
Fig 4.



a Stuffing box  
b Delivery main

the top of the pump. The height of the clack at the upper end of the suction-pipe should not exceed 25 ft. above the lowest level of the water in the well, the best results being obtained with from 10 ft. to 15 ft., and in high speeds the shorter the suction the greater is the efficiency. Although theoretically when the barometer is standing at 30 in., the water should rise in the suction-pipe to a height of 33.99 ft. from the surface of the water (the specific gravity of mercury being  $13.596 \times 30 \div 12 = 33.99$ ), it is impossible in practice to obtain so perfect a vacuum as to allow the water to rise this height, owing to the variations of atmospheric pressure, imperfect joints, and the friction of the pump. The power to work the lift-pump is transmitted by rods working from a beam, or by bell-cranks, or, in a few cases, by direct action, as in the Bull engine. When worked by manual labour, either a lever, or wheel and handle, are used. In deep wells the lift-pump is generally used to lift the water to a tank at the

Fig 3.



a Working barrel  
b Bucket  
c Clack  
d Suction

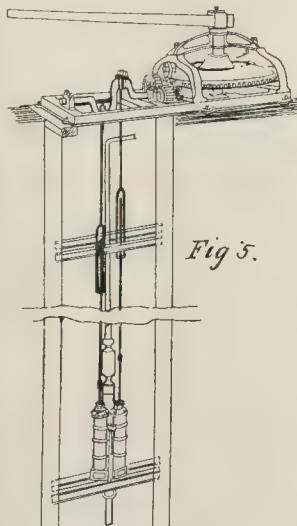


Fig 5.

surface, from which it is taken by force, or bucket and plunger pumps, and delivered at the height required. The price of the ordinary lift-pump, with a working barrel, 3 in. in diameter, complete, for a depth of 30 ft., is 5*l.*, and from 2*s.* 6*d.* to 2*s.* 9*d.* per foot beyond that depth. The capacity of this pump when worked by hand is equal to 400 gallons per hour, lifted from a depth of 30 feet. A double or "two-throw" pump

(Fig. 5), the diameter of the barrels being 3 inches and the stroke 10 inches, worked from the surface by rods, and driven by a horse and gearing, will cost about 35*l.*, including 20 feet of suction-pipe and 50 feet of rising main (or delivery-pipe), and air-vessel complete. The following particulars are afforded by Messrs. S. Owen & Co.

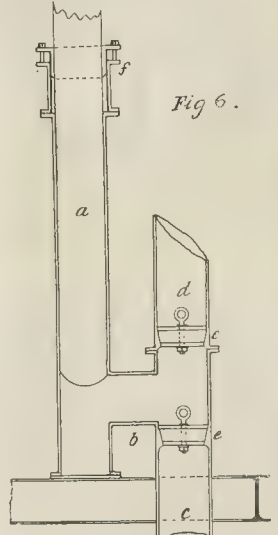
Approximate quantities raised per hour by single, double, and treble-barrel pumps working at a uniform speed of 20 strokes per minute:—

Dim. of Pumps.	Length of Stroke.	Single Barrel.	Double Barrel.	Treble Barrel.
2½ in.	9 in.	165	330	495
3 "	9 "	240	480	720
3½ "	9 "	310	620	930
4 "	10 "	480	960	1,440
4 "	12 "	575	1,150	1,725
5 "	12 "	900	1,800	2,700
5 "	15 "	1,125	2,250	3,375
6 "	12 "	1,280	2,560	3,840
6 "	15 "	1,600	3,200	4,800
6 "	18 "	1,920	3,840	5,760

These quantities raised are assuming the horse to travel at an average rate of three miles per hour, the pumps thus making twenty strokes per minute with the single speed gear. Pumps up to 4-in. barrel may be worked at thirty strokes per minute; unless the height the water has to be raised is great, the speed of the larger sizes should vary from twenty to twenty-five strokes per minute according to the lift.

The plunger or force pump (Fig. 6) consists of a cylinder or working barrel, in which the piston or plunger works up and down through a

Fig 6.



a Plunger  
b H. pipe with doors  
c Suction  
d Rising Main  
e Valve  
f Stuffing Box

stuffing-box or gland. The plunger is either hollow or of solid metal, according to the conditions required, and may consist of one or more plungers, each working in its own barrel. The working barrel is of cast iron, and connected at one end with the delivery-pipe, with valve-box and air-vessel beyond. The suction-pipe and valve-box are at the other end. This pump works either horizontally or vertically, and its action is as follows: in the upstroke of the plunger a vacuum is created which allows the water to enter through the suction-pipe into the working barrel and body of the pump, filling the space left by the plunger. The water is retained by a clack or valve at the top of the suction-pipe, and is again forced by the downstroke of the plunger through the delivery-pipe, being retained by the delivery-valve, and rises at each successive stroke until it reaches the point of discharge. During the up-stroke of the plunger the forward motion of the water through the delivery-pipe would cease, and the discharge would therefore become intermittent instead of



continuous. This is avoided by the use of an air-vessel, the air of which being compressed during the descent of the piston or plunger re-acts and forces the water through the delivery-main during the up-stroke. This prevents the shock to the working parts caused by the force which would be required to overcome the inertia of the water, and at the same time economises the power of the engine by keeping the water in constant motion.

The plunger or force-pump possesses great advantages over the lift-pump in most cases where it can be employed, and is especially suitable where considerable height has to be overcome or where continuous working is required. It is not suitable for positions where the water is likely to rise above the pump, owing to the difficulty of access to the working parts in case of accident. In deep wells, therefore, the lift-pump with open top is to be recommended for the deep pumping, and the plunger for subsequently raising the water to the required elevation.

The lifting and forcing pump, or bucket and plunger combined (Fig. 7), was invented by

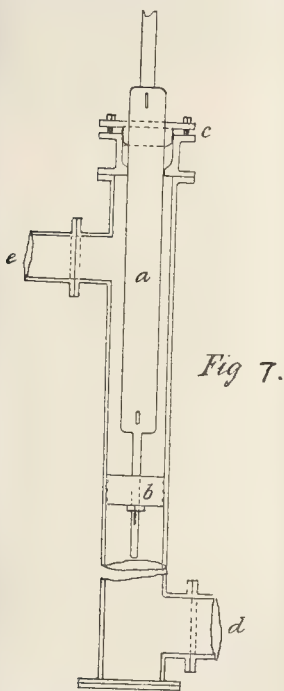


Fig. 7.

- a Plunger
- b Bucket
- c Stuffing Box
- d Connection to Valve Chamber
- e Rising Main with Stop-back Valve & Air Vessel.

Perkins, and introduced at the Lambeth Water-works in 1848. The construction is similar to that of the forcing-pump described above, except that the ram or piston has a bucket attached by a rod to its lower end. The upper portion is enlarged to form the ram, having a sectional area equal to one-half that of the working barrel. The theoretical quantity of water which rises into the working barrel at each up-stroke of the bucket is equal to the capacity of the barrel through which it ascends, one-half of which quantity rises in the delivery or rising main on the descent of the bucket, and the remaining portion is discharged during the following up-stroke. The delivery from the pump is therefore continuous. This is one of the best forms of double-acting pump, as it possesses nearly all the simplicity of the single-acting pump, and is free from the defects of the four-valve pumps. The quantity of water delivered at the up and down stroke is no more than with a pump with single-action, the difference being that the

double-action gives a continuous, and the single-action an intermittent, delivery. This form of pump is used in nearly all the large waterworks.

Horizontal engines and pumps, mainly direct-acting, are frequently used for small supplies, and improvements, during the last few years have justified their use in many of the largest waterworks. The Worthington, Deane, Davidson and other well-known types give good results; they are principally used for forcing to service reservoirs.

The pump-trees or pipes, which constitute the suction-pipe and rising main, form so important and so costly a portion of the pumping apparatus as to require careful design. They are usually 9 ft. long, and consist of cast-iron pipes with flanges, or of wrought-iron or steel tubes, riveted or welded with flanged joints. The cast-iron pipes should be made of hard mottled-grey iron, re-melted in the cupola, and cast vertically in loam, care being taken to keep the metal of uniform thickness and truly cylindrical. In open-topped pumps the diameter is made from  $\frac{1}{2}$  in. to  $1\frac{1}{2}$  in. greater than the working barrel, so as to enable the valves to be withdrawn when repairs are necessary. In close-topped pumps working through a stuffing-box or gland the rising main is usually  $\frac{3}{4}$  the area of the working barrel. The pipes, whether constructed of cast or wrought iron, or of steel, have the flanges machine-faced, so as to be perfectly plumb when bolted together. The joints are either made with red lead or flannel steeped in tallow, and bolted tightly together. In considerable heights of rising main it is the usual practice to reduce the thickness of metal every 54 ft. The wrought-iron or steel tubes for large diameters should be riveted together with a butt strap joint, and the flange formed with an angle-iron shrunk on the body of the pipe and rivetted. The smaller sizes are usually welded or solid-drawn. The pipes should all be painted, or, in the case of small tubes, galvanized.

The following table gives the weight and thickness of cast and wrought iron pipes:—

CAST-IRON FLANGED PIPES.				WROUGHT-IRON TUBES.			
Diameter.	Thickness.	Weight 9 ft. lengths.	lbs.	Thickness.	Weight 9 ft. lengths.	lbs.	per foot.
1½	—	—	14	1	137		
2	—	—	14	1	181		
2½	—	—	12	1	224		
3	—	—	12	1	268		
3½	—	—	10	1	311		
4	—	—	10	1	355		
4½	—	—	10	1	398		
5	—	—	9	1	442		
5½	—	—	9	1	485		
6	—	—	9	1	529		
7	—	—	9	1	—		
8	—	—	9	1	—		
9	—	—	9	1	—		
10	—	—	9	1	—		
11	—	—	9	1	—		
12	—	—	9	1	—		

#### GENERAL BUILDING NEWS.

**RESTORATION OF TRELLECK CHURCH, MONMOUTH.**—This church, which is of the architecture of the thirteenth century, has just been re-opened by the Lord Bishop of Llandaff, after undergoing restoration at a cost of about 2,700l. The principal additions and alterations now completed are five clearstory windows, two new aisle windows on the north side, new tracery east window, opening out of the great western arch, raising of chancel arch, re-seating throughout, lightning conductor, and restoration of all stone and timber work, and retelling the entire building. It has been restored as far as possible on the lines of the ancient building. The architect has been Mr. E. H. Lingen Barker, London and Hereford.

**MANCHESTER TALMUD TORAH SCHOOL, CHEETHAM.**—The corner-stones of the Manchester Talmud Torah School for the Hebrew education of Jewish children were laid on the 6th inst. The buildings are being erected in Bent-street, Cheetham, and the western end of the structure when completed will abut upon a new street, which it is proposed to call Torah-street. At present only a portion of the projected scheme is being carried out. This consists of three class-rooms, and a large hall, the latter being 50 ft. by 20 ft. It is proposed ultimately to add two wings to the school. At present accommodation is provided for from 120 to 150 children, and the estimated cost is about 1,200l. The architects are Messrs. Ogden & Charleton, Manchester; and the builders Messrs. W. Brown & Son, Salford.

**AUCTION MART, SKIPTON, YORKSHIRE.**—A new auction mart, for the Live Stock Auction Mart Company, Limited, has just been opened at Skipton. The new buildings (designed by Mr. J. W. Broughton, architect, Skipton), comprise a springing and office, three double shippings with laying for 124 head of cattle, six loose boxes, boiler-house and

store-room, and lofts; and a passage at each end of the shippings, respectively 10 ft. and 9 ft. wide. The full length of the new buildings is 156 ft., and the widths 75 ft. and 56 ft. They cover altogether about a quarter of an acre of ground. The building of the sale-ring is in the form of a semi-decagon with pilasters at each angle and circular top iron lights between; the roof trusses are of iron, carried by eight iron columns, and support a louvred ventilator. Seating is provided on galleries and inside the railings of the ring for upwards of 200 people. Within the railings is paved with setts. The office, which is within this portion of the buildings, is of wooden framing filled in with glass, and in front of this is a rostrum. There are two entrances for cattle to the first main passage, from which access is gained through upward sliding doors to waiting-pens at each side of the ring, and also to the three main gangways of the shippings. From this passage also is the customers' entrance to the office and entrance to the auditorium. The shippings are about 73 ft. by 65 ft., the roof of which is in three bays carried on iron columns. Over the centre bay is a louvred ventilator. The window-frames are iron, the lower part being half-trellis. The lighting for the shippings is principally from the roof, Helliwell's patent glazing having been adopted. The floors are all concrete, grooved in the form of setts, and with channels at the sides of the gangways. From the second passage access is gained to the six loose boxes and to the store-room and boiler-house. The whole of the buildings are built with Burnley brick with stone dressings, and covered with Welsh slate. The contractors are: Mr. G. Bradley, masons' and bricklayers' work; Messrs. Wm. Roberts & Son, joiners' and carpenters' work; Mr. Foster Horner, plumber and painter's work; and Messrs. Ellison & Fawcett, ironfounders, all of Skipton; Messrs. Manley & Hartley, of Nelson, supplied the cattle-pens and sundry other ironwork; Messrs. A. Dougill & Co., of Leeds, supplied and fixed the iron roof; and the slating was done by Mr. Stanworth, of Burnley.

**HOTEL, PREMISES, NEWCASTLE.**—The Eldon Dining Hall and Grill Room, Grey-street, Newcastle, has just been re-opened, after having been closed for more than two years. On Whit Saturday, 1894, the roof above the dining hall in the basement gable way, necessitating the closing of the premises until they were rebuilt. The interior of the building was completely taken out, and the front razed to the ground. The new building has been erected by Messrs. Walter Scott & Co., Limited, from the designs of Messrs. Oliver & Leeson, architects, Newcastle. The building is on the same site as before, but instead of three shops in front there are now only two. The dining-hall and grill-room is situated in the basement, the entrance being from Grey-street. The building consists of five stories.

**MARKET HALL, GOOLE.**—The Goole Local Board have approved of the plan prepared by Mr. W. J. Tennant, Pontefract, for the erection of a new market hall at a cost of 20,000l., in place of the one burnt down.

**WESLEYAN CHAPEL, GREAT KELK, YORKSHIRE.**—A new Wesleyan chapel was opened on the 10th inst. at Great Kelk, in the Bridlington Circuit. Mr. S. Dyer, of Bridlington Quay, was the architect, and Messrs. Bastiman & Gutherlass, of Kilham, the contractors.

**NEW LIBRARY, ATTERCLIFFE, SHEFFIELD.**—A new library has just been erected at Attercliffe, at the corner of Leeds-road and Beveley-street. On the ground floor are the lending department, a ladies' reading-room, and a committee-room, and on the first floor is the reading-room, which is capable of accommodating 140 persons, with files for twenty newspapers. The entrance-hall is paved with mosaic tiles. The building is of brick, with stone dressings, and the architect was Mr. C. F. Wike, the City Surveyor.

**TECHNICAL INSTITUTE, NEWBURY, BERKS.**—Mr. Alfred Waterhouse, R.A., of Vandoncourt, opened the new Art and Technical Institute at Newbury on the 8th inst. The new buildings adjoin those of the Literary and Scientific Institution, and on the ground floor there are three rooms provided for carrying on classes in woodwork, chemistry, modelling in clay, and shorthand. The library is situated as formerly. The first-floor is reached by two staircases. For the museum two rooms have been retained in the old part of the premises. The School of Art, on the first floor of the new buildings, is 42 ft. by 28 ft. Immediately adjoining this room is a gallery for displaying works of art, and a private room for the use of the Head Master. The exterior of the building is of red brick. The architect was Mr. Walter H. Bell, and the contractor, Mr. Samuel Elliott.

**WORKHOUSE INFIRMARY, GUISBOROUGH.**—The new Workhouse Infirmary, Guisborough, which is being erected from the plans of Mr. Thomas Stokes, architect, Thirsk, is now nearing completion. It is being warmed and ventilated by means of Shorland's patent Manchester stoves, patent exhaust roof ventilators, and improved inlet panels, the same being supplied by Messrs. E. H. Shorland & Brother, of Manchester.

**CATHOLIC SCHOOL-CHURCH AT HYTHE.**—The opening of the new Catholic School-Church at Hythe took place on the 6th inst. The building has been erected by Messrs. G. H. Denne & Son, of Deal, from plans of Mr. A. E. Purdie. The structure is of



red brick, relieved with mouldings, string-courses, &c., and consists of nave, chancel, Lady Chapel, and sacristy. Sittings are provided for 300 persons. The high altar and credos have been designed in keeping with the building, and are enriched with panels painted in oils by Mr. J. L. Ryan, of London and Seabrook. The architecture is Early English. The windows are of cathedral glass, those of the chancel being richer in tone of colour than those of the remainder of the building. The church portion of the latter is in the upper story, the part devoted to scholastic work being below, and this provides accommodation for 225 children.

**TECHNICAL SCHOOLS, WINSFORD, CHESHIRE.**—The foundation-stone has just been laid of the Verdin Technical Schools, Winsford. The site of the schools immediately adjoins the Over Board Schools. The land falling sharply towards the brook at the back, opportunity has been taken of this deflection for placing the plumbers' and fitters' room, carpentering and joinery room, and the accommodation requisite for the mechanical system of heating and ventilating, all at this end of the building, a floor lower than the general ground floor level. The main entrance is in the front elevation facing High-street, and is surmounted by a large "Flemish" scroll gable, and flanked on either side by subordinate gables. Two subordinate doorways, similar in character and treatment to the principal entrance, also are provided. These provide direct communication with the male and female sections of the structure respectively, while the front entrance leads directly through an ante to the gymnasium. Multilined and transomed windows are provided throughout the three principal elevations (excepting to the Art School). The front elevation, and as far as the two large gables on each of the side elevations, is to be faced with J. C. Edwards' Ruabon red stock bricks, and all dressings throughout, window headsills, mullions and transoms, doorways, chimney-stacks, gable-coping, plinth, &c., are being executed in red terra-cotta from the same firm. The whole of the roofs, where exposed to view, are being covered with deep red Ruabon roofing tiles. Internally the joiners' work generally is being executed in St. John's pine, stained and twice varnished. The corridors are to be plastered, having a wood dado mould and skirting, and the floors paved with wood blocks. The gymnasium floor is to be formed of two thicknesses of floor boards, and the walls to same are having a dado 4 ft. high of salt-glazed bricks. The entrance and hall for each sex, and also to gymnasium, are proposed to be paved with encaustic tiling, laid on a cement bed. The building is to be warmed and ventilated by a patent mechanical system, prepared by the Blackman Smead Company, of London and Manchester, under the supervision of the architects. On the ground floor the following rooms are given:—Top-lighted gymnasium 50 ft. by 37 ft., with separate boys' and girls' dressing-rooms and lavatories, also provided with gallery 37 ft. by 9 ft., and having access and egress by two staircases, one from each adjacent corridor. Four class-rooms, each 22 ft. by 21 ft. 6 in., are provided. The superficial area of these rooms can be thrown into one large room 88 ft. by 21 ft. A chemical laboratory, 24 ft. by 19 ft. 6 in., is placed at the farthest end of the boys' corridor, and away from the general teaching-rooms. Three rooms will be arranged in the Art section of the buildings—viz., painting room; drawing from cast; and elementary art room. This suite of rooms is directly approached from the girls' corridor, as well as a wash-house, an ironing-room, &c., for the teaching of laundry work. Ample lavatory and cloak-room is provided for each sex, adjacent to their respective entrances. A committee room, with separate lavatory, is also provided, and on the first floor over the cloak-room, male and female teachers' rooms are planned, being partly in the roof, with separate lavatory, &c., and entered through an ante from the landing of each staircase. The erection of the whole of the work has been entrusted to Messrs. James Fowles & Son, Winsford, from the designs and under the supervision of Messrs. Woodhouse and Willoughby, of Manchester, whose scheme was chosen in open competition.

#### SANITARY AND ENGINEERING NEWS.

**RAILWAY EXTENSION IN THE HIGHLANDS.**—At a meeting of the directors of the Highland Railway at Inverness on the 10th inst. the offer of Messrs. Charles Brand & Son, Glasgow, was accepted for the construction of the last section of the new direct line to Aviemore, extending from the ticket platform at Inverness to Culdoich, in Strathnairn, a distance of over seven miles. The contract price is 104,900l. Under the original contract, which was recently renounced by Messrs. Mackay, the price was 118,000l. A considerable portion of the work has, however, been executed, a sum of over 31,000l. having been expended. The works still remaining to be executed consist of the completion of the stone viaduct over the River Findhorn, over 575 yards long, and rising to a height of from 38 to 125 ft., the completion and construction of over thirty bridges and culverts, and excavations &c., to the extent of over 440,000 yards.

**A NEW RAILWAY TO THE WESTERN HIGHLANDS.**—The West Highland Railway, opened on

the 11th inst., is about 101 miles long, starts from Craignend (twenty miles from Glasgow), and proceeds by Garelochhead, Arrochar, Tyndrum, and Rannoch and Fort William, to its present terminus on the Caledonian Canal. It has been constructed by Messrs. Lucas & Aird. **SEWERAGE WORKS, WEST BRIDGFORD.**—West Bridgford is a suburb of Nottingham, and through a rapid increase in the population, the Local Board find it necessary to extend the sewerage system, and improve the method of sewage disposal. An open competition was advertised, and after examining the plans, the Local Board selected a scheme prepared by Mr. W. H. Radford, C.E., of Nottingham, and decided to engage him as engineer for the proposed works. It is proposed to lay a 15-in. iron sewer about 15 ft. below the subsoil water level, to convey the sewage from a rapidly-extending district to the present pumping station. A new storage tank, about 50 ft. deep, will be put in, to prevent the sewage backing up the sewers when pumping is stopped. There will be two new pumps, and a duplicate engine worked from the present boilers. The present sewage farm will be drained, and improved carriers laid down. It is proposed to apply for a loan of 5,000l. for these works. In addition to these works there will be some miles of sewers in private streets which will be paid for by the private owners.

**SEWERAGE WORKS, MELTON MOWBRAY.**—A Local Government Inquiry was held on Wednesday at the Town Hall, Melton Mowbray, before Colonel J. C. Ord Hasted, R.E., of the Local Government Board, for permission to borrow 4,050l. for improvements at the sewage works. Mr. Edmund Jeeves, the Surveyor to the Local Board, explained the scheme, stating that, after investigating numerous systems of sewage disposal, the Board had decided to adopt the international system of Foronore and Polartie. The sewage is at present treated by the lime process, which, we are informed, has given rise to serious complaints of pollution and the destruction of fish life. The Board have now determined to abandon the old system of tanks and to construct others upon the continuous upward flow self-cleansing principle as embodied in the Candy Tank, which has been also adopted by H.M. Government. In addition to the Polartie filters the works will be provided with three clarifiers to economise chemicals and save labour. There was no opposition, and it is intended to carry out the work forthwith.

#### FOREIGN AND COLONIAL.

**FRANCE.**—M. Paul Blondel, a former "Prix de Rome" man, has been appointed architect to the Louvre and Tuileries in place of the late M. Guillaume. The Department of Buildings has recognised the insufficiency of the Luxembourg Museum for the present demands on it, has recommended the erection of a second museum in the gardens of the Luxembourg. —M. Charles Vriarte and Henri Havard have been appointed Inspectors-General of Fine Arts. —A civil engineer, M. Villain, has brought forward a new project for a metropolitan railway of an economical kind, the main point of which consists in prolonging and meeting the Vincennes and Moulins lines, and giving them a common central station in Paris. —Baron Rose, a former Councillor of State, has left to the Cluny Museum a fine collection of ancient tapestries and furniture. —The Government has decided on the reconstruction of the School of Decorative Art at Limoges, and also of the Adrien Dubouché Museum in the same town, at a cost of about 1,200,000 francs. —There is talk of transforming entirely the whole of the old quarter of Marseilles behind the Bourse. The cost of the proposed improvements is estimated at 60,000,000 francs.

The municipality of Bordeaux is considering a scheme for a grand new street between the principal theatre and the Gare du Midi. —An architectural competition is to be opened by the Préfecture du Nord for the construction of two prisons, one at Douai, the other at Lille, at an estimated cost of over a million francs. —Madame Paul Baudry, the widow of the eminent painter, has presented to the museum of La Roche two fine pictures by her late husband. —The Duc de Trevisse has left to the town of Ajaccio an entire collection of objects which belonged to Napoleon. —The series of paintings by M. Tissot, in illustration of the Life of Christ, which was exhibited at the Champ de Mars Salon this year, have been bought by the "Maison Mané" at Tours, to serve as illustrations to a religious publication. —The widow of the late Jules Ferry has had erected to his memory, in the cemetery of Saint-Dié, a monument consisting of a high pyramid in green granite, on a basement decorated with acanthus leaves. In front of the pyramid is the bust of Ferry in bronze, after a marble one by M. Guillaume, the sculptor. A statue of Ferry, on which M. Mercie is at present engaged, is to be erected not far from the above-mentioned monument. —The death is announced, at the age of 72, of the eminent animal sculptor, Auguste Cain, an old pupil of Rude. We shall have more to say of him and his work in a future communication. A few days before his death he had presented to the city of Paris his fine group of "An Eagle and Vulture Fighting over the body of a Bear," which will probably be set up in the Square Montholon.

#### MISCELLANEOUS.

**BUILDERS' CLERKS' BENEVOLENT INSTITUTION.**—A special general meeting of the institution for the election of two pensioners on the relief fund, and of one child to the benefits of the orphan fund, took place at the offices of the institution, 21, New Bridge-street, E.C., on the 15th inst., the President, Mr. William Shepherd, occupying the chair. There were four candidates for the two vacancies to the widows' pension (of 20l. per annum), viz., Mrs. S. A. Bennett, Mrs. S. Hill, Mrs. Lovett, and Mrs. M. Smith. At the close of the poll Mrs. Hill and Mrs. Smith were declared duly elected. For the orphan vacancy, Thirza M. Smith (a daughter of one of the successful applicants for the pension), being the only candidate, was duly elected by show of hands. At the close of the proceedings, the scrutineers (Messrs. Ernest S. Rider, Thomas Stirling, jun., and H. W. Parker) were thanked for their services. A vote of thanks was also accorded to the President for his kindness in attending and presiding as chairman of the evening.

**WINDOW, BEAMISH CHURCH, DURHAM.**—The 5-light window of this church has just been filled with stained glass. In the centre light Our Lord is represented as seated in the Apocalypse in a long robe and girded with a golden girdle and crowned. He stands in front of a vine in the form of a cross with arms outstretched, thus representing poetically the priest and the victim. In the two inner lights are figures of adoring angels. In the two outside lights are the figures of St. John. The large tracery window, contain at the sides Moses and the pelican feeding its young, still carrying out the idea of the Sacrament. The work has been carried out by Messrs. Percy Bacon & Bros. The window was executed from instructions of Mr. C. Hick, architect, Newcastle.

**REVEREND STONYHURST COLLEGE, BLACKBURN.**—During the Centenary Festival at Stonyhurst, a new window in the boys' chapel was dedicated. It is of carved oak, by Mr. Hedley, of Newcastle, containing four paintings, each 6 ft. square, illustrating scenes from the life of St. Aloysius. They were executed by Messrs. Percy, Herbert, and Archibald Bacon, acting together as Percy Bacon & Bros., London. The whole was under the superintendence of Messrs. Dunn & Tunson, architects, Newcastle.

**CRYSTAL PALACE SCHOOL OF ENGINEERING.**—The certificates awarded for the summer term to the students of the Crystal Palace School of Practical Engineering were distributed on the 10th inst. In the list of the south tower by Mr. William Shefferson, member of the Council of the Institution of Civil Engineers. The Chairman of the Company, Mr. G. T. Rait, in addressing the students, dwelt upon what engineering was, what was its position and prospects, and what part they took in it. All over the world there was evidence of abundance of work for the engineer who was desirous of doing it. He wished the rising generation would properly realise the responsibilities and opportunities before them. Every young engineer should take the earliest advantage of the opportunity of visiting America. The Crystal Palace School had done much good, and was capable of doing a great deal more. He urged them to put honest work into their calling, and to do it with a view to the benefit of the world. Mr. Biggs moved a vote of thanks to the examiners, which was acknowledged by Mr. Benedict. —Mr. Wilson (principal of the school), said they had now been established twenty-three years, and that their members were scattered all over the globe, and some of them held very high positions. The term just closed had been one of hard work, nearly all the students having been determined to make the best use of their time. They got about sixty new students every year, and mostly from the recommendation of old students. —Mr. Rait, in moving a vote of thanks to the Chairman, announced that the directors of the Palace intended to hold a South African Exhibition there, to be opened next May, and he thought it would be of special interest to engineer students.

**MEMORIAL WINDOW, COLESHILL CHURCH, WARWICKSHIRE.**—The west window of Colehill Church has just been filled with a stained-glass memorial window, the subject treated being that of the Epiphany. The inscription is: "To the Glory of God and in affectionate memory of George Digby Wingfield Digby, of Sherborne Castle, Dorset, and of Colehill, Warwickshire, who restored this Church in 1859, and died in May, 1883, this window is placed by his relations and friends, 1894." Mr. T. W. Camm, of Smethwick, designed the window, and it was executed in his studio.

**GLASGOW BUILDING TRADES EXCHANGE.**—The Building Trades Exchange of the City and District of Glasgow (Limited), which is situated at 39, Gordon-street, was opened on the 8th inst. by the Hon. the Lord Provost. The honorary President, Sir William Arrol, presided, and, in his introductory remarks, explained the objects of the Exchange. Its origination was due to what had been seen by several gentlemen connected with the Glasgow building trades in connexion with a similar institution in America. The friction between the various sections of the building trade had been so much reduced by means of the American Exchange, compared with



what it was on this side of the water, that the members who had inquired into its working thought it desirable that such an institution should be started in Glasgow. So far as he knew, it had not been instituted for the purpose of any combination. It was initiated to enable builders, measurers, architects, or any other class of the community to meet and discuss any matter connected with the building trades, and all members met on the same level. Further, the Exchange had been started for the purpose of guaranteeing that members who undertook certain work would carry it out according to the specification. If they failed it would be imperative upon the committee to deal with the matter.—The Lord Provost said that one of the members of the Exchange had said that should join this institution, as the Glasgow Corporation was now becoming a very large builder. He was not quite clear that that was a sound argument. He agreed in some measure with the Corporation building to show an example, but he did not approve of the Corporation becoming builders as builders. There were times when they had to step into the breach, and he was quite sure that the information they would get in such an Exchange as this would be of great value to the Corporation, as well as to the members. The success of this institution would depend on the spirit of comradeship with which they worked it. If the slightest trace of jealousy or feeling crept into it its usefulness would be destroyed, but if it was carried out on the lines indicated by Sir William Arrol he had no doubt it would meet a felt want. They had many successful Exchanges in Glasgow, and he did not see why the Exchange connected with the one prosperous trade in Glasgow, the building trade, should not have an equal success.

## LEGAL.

## IMPORTANT POINT UNDER THE PUBLIC HEALTH ACT, 1888.

IN the Queen's Bench Division on the 9th inst. Mr. Justice Mathew and Mr. Justice Kennedy, sitting as a Divisional Court, had before them the case of Thorold v. the North Ormesby Local Board, it being an application on behalf of Mr. Thorold for a mandamus to the Board to approve certain plans.

The case raised a question of some importance as to the principle upon which Section 3 of the Public Health Act, 1888, empowers the Local Boards as to the erection of buildings beyond the front main wall of houses on each side, is to be construed. The section in question enacts that it shall not be lawful in any urban district, without the written consent of the Urban Authority, to erect or bring forward any house or building in any street or any part of it—such building—beyond the front main wall of the house or building on either side thereof in the same street. The facts were shortly as follows:—The Local Board District of Ormesby has a population of something like 9,000, and comprises in its area two places, viz., the village of Ormesby, with a population of about 150, and the town of North Ormesby, with a population of over 8,000. North Ormesby is about two miles from the village, and has sprung into existence within the last few years. Ormesby-road is a road leading from Middlesbrough and North Ormesby to the village of Ormesby, and part of it is named Westbourne-grove, which forms part of North Ormesby, and was treated by the Local Board of Ormesby as one of the streets of that place. White-house-lane commences at a point where North Ormesby as a town exists, and continues for about two miles to the village. For the last sixteen years the Local Board have treated West-terrace and Westbourne-grove as a public street, and have lighted and watered it. They have also from time to time served notices upon the frontagers of the street under section 105 of the Public Health Act, 1875, and the work has been done by or charged on the frontagers. The whole of the east side of West-terrace has been built upon some years since, and comprises some twenty-two houses, and nearly the whole of the east side of Westbourne-grove is built upon, and comprises villa residences. In November, 1893, the applicant built a dwelling-house on the west side of Westbourne-grove, at a distance of 330 ft. from Grove-road, setting back the house 20 ft. from Westbourne-grove. The only approach to the house, which is a small one, is with a door leading into the house facing Westbourne-grove. The applicant submitted to the Board plans of four small cottages he intended to erect in Westbourne-grove, such plans showing that each cottage had a frontage of 18 ft. to Westbourne-grove, and that the front main walls of the cottages would be only 10 ft. from Westbourne-grove. The distance between the applicant's residence and the proposed cottages to be erected was about 90 ft., and the intervening space consists of land purchased by him for building. The Local Board being of opinion that the "building line" in that part of Westbourne-grove, north of Grove-road, was fixed by the applicant's house, the front main wall of which was 26 ft. from Westbourne-grove, and that it was undesirable to have houses erected in Westbourne-grove in a regular line, rejected the plans as being in contravention of the section of the Act of 1888 before referred to.

At the conclusion of the arguments of counsel,

Mr. Justice Mathew, in giving judgment, said that each case must be determined on its own circumstances, and the enactment construed reasonably. When it was proposed to take away a man's land it was necessary to look carefully into the circumstances. It appeared that Thorold had built himself a house in a certain line and then proceeded to build four cottages at a distance of 90 ft. in the same road, the front walls of which would project slightly beyond that line. Where there was no continuance line of building of any kind, the enactment could hardly apply. Where land was laid out for building purposes it might be different, but they (their Lordships) had to deal with the case as it stood. A house had been erected, and buildings were proposed on the opposite side of the road. He could not see why they were objected to. The only answer the Board made was that they were entitled to exercise a discretion—which, however, turned out to be caprice—to say how, under such circumstances, the buildings on the opposite side should be used. It appeared to him that there was no evidence of the existence on the side of the original buildings of any line of frontage.

Mr. Justice Kennedy concurring, their Lordships made the rule absolute for a mandamus to the Board to approve the plans.

Mr. Scott Fox appeared as counsel for the applicant, and Mr. Roskill for the Board.

## MEETINGS.

FRIDAY, AUGUST 17.

Architectural Association. Annual Excursion, Wells (concluded).

Sanitary Inspectors' Association. Annual Summer Meeting, Ramsgate.

Incorporated Association of Municipal and County Engineers.—Members leave London to take part in a Meeting at Brussels.

SATURDAY, AUGUST 18.

Architectural Association.—Annual Excursion, Wells (concluded).

Junior Engineering Society.—Summer Excursion, Cardiff and District.

SATURDAY, AUGUST 25.

Liverpool Engineering Society. Excursion to the Wirral Railway Works and Dee Bridge.

Glasgow Architectural Association.—Visit to New Craig House, MEwan Hall, and University Union, Edinburgh.

## RECENT PATENTS:

14,624.—ABSTRACTS OF SPECIFICATIONS.

14,624.—WATER-CLOSERS: *J. Jones and another.*—The improvements which are the subject of this patent relate to the construction of water-closet traps with an air chamber at or near the upper bend, and forming a flushing rim with a large outer hole on the underside, opposite the trap mouth. A specially-moulded piece of earthenware is introduced into the down flow part of the S trap, and where the flanges on the meeting ends are to be connected they have a cork washer fitted between them.

15,109.—EXTRACTING VENTILATORS AND COWLS: *T. Whitehead.*—According to this invention, improvements in construction are introduced with the object of gaining greater extracting power, by reducing the weight of the working parts and by increasing the driving-power by the use of a series of wind-chambers in connexion with improved driving-vanes.

15,597.—BRICK-MAKING MACHINERY: *W. Johnson.*—The patent relates to making "stiff plastic" bricks. The material after being crushed or otherwise prepared is thoroughly mixed, pugged, and kneaded to the required fineness, and afterwards channeled and pressed into conformity to the kiln without first having to dry the bricks. Mechanism for performing all these processes is described in the specification.

15,795.—DRY CLOSURES: *R. C. Sayer.*—According to this invention heat is used to reduce the soil, which is dealt with in a reducer, the liquids being led away and filtered, the solids reduced to dust by heat and put into a receptacle for extraction, and the residual gases are sent through a filter to the atmosphere.

16,271.—CASEMENT WINDOWS: *W. James.*—The object of this invention is to construct a casement window, without sacrificing the advantages of rebates and other contrivances for making it water-tight, to be opened inwards and outwards, so that while attaining the convenience of opening outwards for ordinary use, it can be opened inwards for cleaning, repairing, &c. This is effected by having an inner frame fixed in the sliding sash.

16,682.—SKYLIGHTS: *A. Schmitt and another.*—The skylight which is the subject of this invention has for its main feature a notched ridge made in one piece with the frame of the skylight, and also with fittings or flanges, guard and angle-piece, all to ensure a perfectly damp-proof closing of the skylight and enabling it to be readily raised and opened when required.

16,690.—AUGER-BITS: *A. G. Brown.*—The cutters are made separately, and in various sizes, to be attached to a common shaft, the idea being to provide an auger-bit in which the various sizes may be cut, and which will be extremely portable, as the cutters occupy but little space, and only one shaft is necessary.

17,093.—FACING BRICKS: *M. Villaret.* These are of larger surface than those generally employed, and not only answer the purpose of getting through the work more rapidly, but also give greater diversity of surface, as, for instance, the old small sizes can be alternated with larger sizes, or the smaller bricks may be used in small curbs or members, and the larger where greater surfaces are to be covered.

## NEW APPLICATIONS FOR LETTERS PATENT.

JULY 26.—14,559, E. Grobe, Preservation of Wood.—14,605, A. Ewen, Sash Fastener.—14,612, J. Baker, Disinfecting Water-closets, Urinals, Sinks, &c.

JULY 31.—14,653, C. Foulger, Water-closets, Urinals, Sinks, &c.—14,658, J. & B. Bigg, Clearing congested Drains and Sewers.—14,699, W. Whittaker, Fireproof and Waterproof Ceilings and Flues.—14,701, R. Davidson, Window-sash Fastener.

AUGUST 7.—14,710, J. Day, Waste Water-closets.—14,715, J. Quarmby, Traps for Drains, Water-closets, &c.—

14,752, L. Robson, connecting Sash-closets to Window-sashes.

AUGUST 2.—14,779, L. Seager, Joining Pipes, &c.—14,786, W. Sharp and W. Cruickshanks, Multiple Flushing Syphon for giving any number of syphon flushes from large cisterns.—14,807, R. Dately, Window Fasteners.—14,812, A. Phelps, Window-sash Fastener.—14,823, O. Hocking, Windows.—14,843, W. Thrift, Draught Preventer for Doors.—14,848, L. Mack, Manufacture of Cement from schist and bituminous matter.

AUGUST 3.—14,877, J. Travis, Sash-fasteners for Windows.—14,879, A. Taylor, Severe Flushing Cisterns.—14,881, T. Biggs, Double Seal Scour-out Closet.—14,916, P. Stiens, Sanitary Pipe.—14,924, A. Mulheerd and G. Hockford, Manufacture of Artificial Stone, &c.

AUGUST 4.—14,952, T. Knowles, Revolving Receptacles for Waste Water to be used in the Flushing of Water-closets Flushed with Waste Water.—14,950, W. Griffith, Butt and Hinge for Doors and Gates.—14,958, W. Wagner, Ornamental Covering for Floors and Walls.

PROVISIONAL SPECIFICATIONS ACCEPTED.

14,494, F. Weiss, Fastenings for Doors, &c.—17,756, S. Tomlinson, Windows.—11,894, S. Burgess, Hooks and Catches for Doors.—11,950, J. Lakin and C. Johnson, Raising and Lowering Windows in Sashes, and as a Draught and Dust Excluder.—12,699, J. Hulton, Flooring.

12,688, J. Booker, Hinges.—13,401, C. Barr, Sash-fastener.—13,521, T. Wyatt, Clamping of Floors, Joinery, &c.—13,556, S. Hill and R. Hodges, Opening and Closing Fanlight Windows, &c.—13,731, W. Ward, Screws.—13,850, D. Dawson, Sash-fasteners.—13,867, H. Fletcher, Chimney Tops.—13,926, J. Fillo and others, Treatment of Wood for Preserving, &c.—14,028, J. Russell, Imitation Stained Glass.—14,027, H. Dawson, Sliding and Hinged Window-sash and sash-fasteners.—14,081, F. Stolte, Fireproof Ceilings and Floors.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

15,485, E. Man and J. Hopwood, Automatic Switch for Electric and other Light, applicable to a Door.—18,615, F. Ham, Air Flaps for Sewers and Ventilation.—3,743, G. Clarke and others, Gullies for Sinks, Downspouts, Lavatories, &c.—8,623, H. Berger, Wood-planing Machines.—12,651, A. Paillet, Hinges or Supports for Gates, Doors, &c.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

AUGUST 7.—By Debenham, Treason & Co.: "The Duke's Head" Beer House, 1, Duke-st., Henley-on-Thames, 500.

AUGUST 8.—By Weatherall & Green: 1 gr. of 181, Christie-road, Hackney, ut. 50 yrs., gr. 2s. 2d., 2054.—By H. Francis: 22, Park-rd., Wandsworth, 1, r. 481, 665.

AUGUST 9.—By Newson & Co.: 43, Brenton-st., Limehouse, 1, 2051, 3, Kirkdale-ter., Leytonstone, ut. 71 yrs., gr. 81, r. 451, 500; a plot of f. land, Prospect-rd., Woodford, 951; a plot of f. land, Avenue-rd., 751.—By H. Ward: F. stalling, Bello Bridge-rd., Acton, 1, 702, 164, 7604; four plots of f. land, 3301; stabling, Common-rd., Westbourne-grove, ut. 49 yrs., gr. 201, r. 651, 500.—By S. Simon & Sons: 23 to 45, odd, Granfield-st., Battersea, ut. 63 yrs., gr. 541, 1400, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

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## ILLUSTRATIONS.

The New Hungarian Houses of Parliament, Budapest.—Herr E. Steindl, Architect:—

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Interior of the House of Lords .....	Double Page Ink-Photo.
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### Dr. Flinders Petrie's Excavations at Koptos, Egypt.



WE have already referred (see our issue for July 28, page 52) to the exhibition of various objects, the results of Dr. Flinders Petrie's last season's work in Egypt. These

are still on view in the gallery set apart for the Edwards Bequest at University College, Gower-street, and the exhibition will remain open to the public, without card of admission or any other formality, until the end of August.

Dr. Petrie has already pursued researches at more than one site selected with some special object. Thus the work of the year before last was at Medum, in order to discover if there were traces of very early sculpture and work anterior to that of the Twelfth Dynasty, which he had previously investigated at Kahun. The excavations produced evidences that the pyramid was the work of Seneferu; and the small temple found in front of it proved to be the work of the same king—one of the most ancient little buildings remaining in the mysterious land of Egypt, and one of the most perfect. We may express gratification at the fact that, to save this little treasure of ancient work from the searchers for building stone, it was again covered over with the excavated earth.

The exhibition of last year revealed the peculiar art to be found at Tell-el-Amarna, and nowhere else in Egypt. The buried heaps of the city founded by Khunaten and destroyed by his immediate successors were excavated, and a new page of Egyptian art was revealed, showing a naturalistic school of design which appears to have sprung into existence and to have disappeared with the short-lived king.

The researches which have produced this year's exhibition were undertaken with a clearly-defined object. It was to discover, if possible, traces of the earliest works of the Egyptian race, and to throw light upon the question as to whence the people came, and when.

In the dim traditions of the past, and in more than one inscription, the holy land of Punt is referred to, with the belief, strengthened by many ethnological evidences of race, of language, and of arts, that

this land lay to the east, and that the people, like so many others, journeyed away from the east, westward. There is a small town, marked on the maps variously as Keft or Koft, which many a traveller has passed by without thinking it worthy of staying his course to Thebes to investigate, and which, from the time of Norden to our own, hardly comes in even for notice beyond that of the mere name, even if this is mentioned. And yet this town, if the name can be given to the small group of poor-looking dwellings which at present forms it, has played an important part in the history of Egypt. It stands about twenty-five miles away from the once huge metropolis of Thebes, on the east bank of the Nile, and from it the main roads across the Eastern desert branched out, one proceeding almost directly east to the ancient town on the banks of the Red Sea now represented by Kosseir, and another going south-east to the sheltered but far-off port of Berenice. One or other of these ancient routes, used so constantly as a means of communication between Egypt and the Eastern world beyond, was likely enough to be the way by which the earliest immigrations were made into the land. But where is Punt? Is it merely the arid deserts of Arabia on the opposite side of the Red Sea? or is it the more congenial land of Persia beyond it? Or is it India? Certain, however, it is, that the earliest races, as apart from what appear to be the aborigines, have been recognised by attributes which speak of Semitic origin; and their love of the arts and their intelligence have already been alluded to.

The modern town is known to have been the site of the ancient Koptos, and here, where the roads from the seaboard terminated, Dr. Petrie determined to devote his energy, considering that here, the first point where immigrants from the East would come upon the waters of the Nile, would be perhaps the most likely spot for their first settlement to be made. Abydos is known to be a site of very early foundation, but it is far more to the north, and likely therefore to have been occupied in later years, after the first arrival of the incoming race, when they had so far mastered the land and developed themselves. At Koft was the well-recognised site of a temple, robbed all but entirely of its stonework by the villagers, but not yet ransacked by that enemy of all knowledge, the modern digger of antiquities merely for commercial purposes.

The temple site, being the one special object in the town likely to indicate the best

traces of ancient times, was selected in preference to any other, and it has been thoroughly excavated during eleven weeks of hard work in the manner peculiar to Dr. Petrie, who never leaves any object uninvestigated. The excavations have yielded important results, fully justifying the choice of the site, and the objects found have been made to tell their history, not only by their inscriptions and other evidences, but by the positions in which each object was discovered having been carefully noted.

A huge length of sun-dried bricks, shorn of its face work, proved to be the south wall of enclosure of the ancient city. Within the enclosed area of the town, and about 400 ft. from the wall to the east, are the remains of the great temple. The excavations have determined its ground plan. With walls in some cases 25 ft. thick, it measured 322 ft. from east to west, and 218 ft. from north to south, internally, the walls being formed of sun-dried brick. The axis, to be exact, however, is 9 deg. north of east. To the west, outside the enclosing walls, and between them and the town wall, distinct traces were met with of three pylons, or entrance gateways, in addition to a fourth in the wall of the town itself. Two of these were in line with each other from north to south, like two gateways in the same wall. In front of the great temple were traces of three flights of steps, of different dates, and of a front of later workmanship, of the time of the Ptolemies. It was wisely determined to excavate the whole of the area of the site, especially of the space within the temple walls. The pickaxe and spade speedily revealed traces of other buildings within the enclosing area, which latter itself proved to contain a larger area than had at one time been the case, for walls of the same date as the front, built of sandstone, were found within them on three sides, arranged close to them, but just a little only out of parallel. Within the temple enclosure, the progress of the excavations revealed the outline of the temple proper, situated in a position not central with either sets of the enclosing walls, and nearer to the west than to the east.

The traces of the walling were not very distinct, but the building appears to have measured 97 ft. from east to west, with a width of 70 ft. There were no traces left as to how this wide space had been roofed over, which is somewhat extraordinary supposing that the temple had followed the usual arrangement in being covered over. The absence of traces either of columns or of





others are incised in the more usual way. They have evidently formed the casings to walls of sun-dried brick, similar to the manner in which similar material was faced at Nineveh. The position where they were found is shown on the plan. The sculptures are very fresh, and many of the slabs can be united.

Next in order of date, are sculptures of Amenemhat I. and Usertesen I., who rebuilt the temple. The granite jamb of the doorway has been discovered and it is on view. It is carved in slight intaglio with names and titles. There is also a fine head of Osiris of this period.

These are followed in period of time by objects of the age of Tahutmes III., who again rebuilt the temple, followed by others of the Ramessesides and of the Ptolemies, and these again by the later works of Roman date.

Some of the inscriptions found are of much interest, not only on account of the clearness of the lettering and the execution, but of the subjects recorded.

One of the most interesting of these in point of date, as well as its subject, is a long record of a Royal Commission sent to Koptos to depose the prince for treachery, and to instal a new family in his place. He and his descendants are driven from the place and their property confiscated. It is of the time of Antef V. A squeeze only is shown. There is a portion of a fine tablet, a hymn of praise of Ramessu II., an inscription of a Major Domo of Queen Arsinoe, who rebuilt the temple, and the dimensions are stated. There are also inscriptions of various later times. One in Greek is by the standard-bearer of the Palmyrene archers, Markos Aurelios Belkabus, dedicated to the great god Ierabolo; another, also in Greek, recording the visit of the Emperor Quietus to Koptos; another, in Latin, setting forth the dedication of the bridge at Koptos in the time of Domitian.

It will be seen by the inscriptions and the sculptures that the rebuildings of the temple are frequently recorded. In addition, there is yet another setting forth that King Rahotep, of whom no monuments were previously known, rebuilt part of it. The ground plan indicates many of these rebuildings, and it would be a curious and not at all an impossible study, to identify the various periods of the work with fair exactness. But although the architectural features remaining are so few, the curious evidences of certain foundation deposits are very noteworthy. Dr. Petrie has already found similar ones elsewhere, and has established the fact of their existence in all buildings of importance. Here, the positions where they were found is marked on the plan. They were found in pits dug beneath the walls, and many articles of pottery were placed in each. As many as about two hundred were recovered from the largest pit. There were also a few alabaster vases. These were inscribed for Tahutmes III., beloved of Min, of Koptos. There were also models of corn-grinders, made of sandstone and inscribed in blue. In another pit ribbed beads were found; also bronze models of tools—chisels, knives, and axes. The angles of the Temple of Ptolemaic times also had their foundation deposits, consisting of specimens of pitch, alabaster, basalt, sandstone, copper and lead ores, and model mud bricks, plaques of red and other glass, bricks of lead and copper, a hollow silver case made on wood, and lastly, limestone blocks of small size, gilded.

The architectural details consist of a curious capital with twisted lobes, and a volute, said to be of Roman date, but possibly older, which has been painted in bright colours, red and yellow on a blue ground; a curious gargoyle or spout from a cornice of late date; several interesting examples of pierced limestone slabs to cover over the openings of windows, in much the same way as wood lattice-work is now used in Egypt; but the patterns are either simple slits placed side by side, or mere diagonal diamond work; one slab is, how-

ever, pierced to form a cross-like pattern, which an examination proves to be the Tau, the emblem of eternity.

The sculptured slabs exhibit many peculiarities of Egyptian work, one of the most interesting being that which represents Usertesen dancing before Min. He holds the *harp* and oar, and the figures, which are drawn with great precision, are executed in the usual style of Egyptian sunk work, with admirable care. Since this work may very safely be assigned to a period so remote as 2,600 years B.C., it is worthy of careful study as showing the condition of the arts at this remote period. It was found covered with stucco and used as old material in one of the later foundations. But a still more delicate piece of work, now placed close beside the above, is a part of a temple sculpture of Amenemhat I. It is in delicate low relief of the beginning of the twelfth dynasty. This, too, was found buried in fragments beneath later work.

Under the portico of the University is a large tablet of the architect of the Ramessesum, which represents Ramessu II. offering incense before the bark of Isis of Koptos, borne upon the priests' shoulders. One of the finest of the later works is a granite head of a Roman Emperor called Caracalla, and probably correctly so.

There is a large collection of pottery objects, for the most part of well-known and familiar types, of which a great many examples are from the curious Foundation deposits. There are many examples of Roman date, showing some instances of similarity with finds of the same age in Europe, with many interesting differences. But the most noteworthy objects are a few examples of very different nature to anything hitherto found in Egypt—about which Dr. Petrie has much to say. They were found in the centre of the oldest temple, and are formed by hand, of very coarse Nile mud, faced before baking with a polish of red hæmatite. Elsewhere are exhibited a large number of flint knives and flakes found in the town, lying upon the stratum of clay before referred to, and buried beneath 20 ft. of accumulated earth. In addition, there are ancient models of sacred tanks, altars, corn-grinders, and many other objects which hardly can be done justice to in a brief article.

The plan is published by Dr. Petrie's courtesy, and is copied from the drawing prepared by him, exhibited with the various objects.

#### NOTES.



EEK after week passes without any settlement being arrived at in the Scotch coal strike.

The bulk of the miners of that country have now been idle for upwards of eight weeks, and the loss of trade has been enormous. Shipments from all Scotch ports during last week were the smallest ever recorded—indeed, it is stated that for the last two months the Scotch coal exports show a decrease of over a million tons. There is the inevitable distress amongst the men and their unfortunate families, and it appears doubtful if the English miners will long continue their levy, which is raised, in some districts, with considerable difficulty. It would have appeared strange that no successful effort has been made to bring the disputants together, but that their national determination of character fully accounts for an unwavering attitude on both sides. Of course, efforts have not been wanting to bring the masters and men together. The Government are willing enough to give their assistance, but rightly hesitate to interfere prematurely. The President of the Board of Trade stated in the House of Commons on Saturday that confidential communications were passing between himself and the parties interested with a view to bringing about a settlement. It is satisfactory to note, in view of statements which have been

freely made, that Mr. Bryce was able to assure the House that, so far as he knew, nothing had emanated from the masters amounting to a refusal on their part to meet the men, and that there was no reason to take a gloomy view of the position.

THERE is no doubt that the Wilson Tariff Bill, although it is far from being a Free Trade measure, does something towards lessening the heavy import duties in the United States. So far as it goes it will be of some assistance to the English manufacturers, and lessen in some measure the heavy cost of many articles to the inhabitants of the States. But after all it is a small step, and does not show any real tendency in the Americans to break away from the short-sighted policy of fiscal protection. The Tariff is so full of details that it is impossible to do more than give the general impression of it. By way of example in detail, however, the following facts may be stated:—Ornamented, glazed, painted, enamelled, vitrified, or decorated tiles will pay a duty of forty per cent., *ad valorem*, against forty-five per cent.; on cast-iron pipes of every description, the duty will be sixteenth of one cent. per pound, against nine-tenths of one cent. per pound. White lead and white paint and pigment containing lead, dry, or in pulp, or ground, or mixed with oil, will be charged a duty of one and a-half cents. per pound, as against three cents. per pound. The duty on steel rails is reduced from fifty-eight to thirty-five per cent., and on bars of rolled iron, from sixty-two to forty-five per cent. The existing duties, it will thus be seen, are still very substantial, and in many instances will be still practically prohibitive. Painters and sculptors, however, may fairly rejoice, since oil-paintings and water-colour drawings, and statuary, which are at present subject to a duty of fifteen per cent., will, in future, be admitted into the United States free of duty. We cannot doubt that the withdrawal of the duty will tend to brighten the prospects of English and French artists in their relations with the States.

THE award of honours to artists exhibiting at the Antwerp Exhibition has recently been published, and contains the names of comparatively few representatives of Great Britain. The members of the jury voting as guardians of the interests of British exhibitors were MM. Albrecht de Vriendt, Fernand Khnopff, Charles Ooms, and Henri Schaeffels. Sir Frederic Leighton is *hors concours*, as having already obtained the highest distinction at the International Fine Art Exhibition of 1885; whilst the highest award, the medal of honour, is now received in the section of Painting by Mr. L. Alma Tadema, Sir John Millais, and Mr. Oules. First-class medals are awarded for painting to Sir E. Burne-Jones, Henry W. B. Davis, and Henry Moore. Second-class medals are bestowed upon Mr. R. B. Nisbet for Painting, Mr. Thomas W. Cutler for Architecture, and Mr. D. Y. Cameron for Engraving.

AN old red-brick house at the north end of the west side of Fulwood's Rents, High Holborn, and abutting on Field-court, Gray's Inn, has, after the recent fire, just been dismantled, and will be pulled down. It is known that in the Rents stood "Squire's" coffee-house; Timbs, in his "Curiosities of London," identifies as being "Squire's" the house we cite, where, in Charles II.'s reign, Medbourne and Oates's Club used to meet, and whence many papers in the "Spectator" are dated. Fulwood's, commonly known as Fuller's Rents, formed, long ago, the principal entrance into the Inn Gardens. It is named, it appears, after one Fulwood, to whom, by an order of Feb. 5, 1593,\* the benchers paid 150*l.* "for a parcel of ground in Holborne for building a

\* "Gray's Inn." By W. Ralph Doulton, Librarian 1886.



gate out of Gray's Inn into Holborne"; in the following year they laid out the present gateway in High Holborn and the roadway leading to it out of South-square, *olim* Holborn-court. The buildings formerly opened into Field-court, perhaps so called from the neighbouring Jockey's-fields, and, until 1697, had been a place of sanctuary, with, in later years, a Court of Requests for debts under forty shillings, for the Finsbury Division. Albeit of low repute at this day, Fulwood's Rents enjoyed some note in the eighteenth century; here were taverns and coffee-houses of good resort, including the "Golden Griffin," the "Castle" (at its east end), and "John's," one of the earliest of the coffee-houses; as also a punch-house, kept by Ned Ward, author of the "London Spy," who died there in 1731. In the British Museum are some water-colour drawings, made by Archer for his "Vestiges of Old London," of the interior of an early seventeenth-century gabled house on the east side, showing the oaken panelling of two rooms, one having carved beams on its ceiling, and a finely-carved mantelpiece, in oak, with arched niches and caryatides. The register of St. Andrew's, Holborn, records the burial, "out of Fulwood's Rents," on December 1, 1618, of Jane, sister of Christopher Fulwood, Esquire.

THE West India Docks, for which new entrances from the river at Blackwall have just been completed, were built in 1800-2 by Jessop, William Pitt laying the first stone. They are the first that were constructed in London, and were then the largest in the world. They consist of an import and an export dock, lying in the Isle of Dogs, with entrances from Limehouse and Blackwall Reaches. The East India Docks, lying to the north-east, were opened in 1808; thirty years afterwards the two companies became one. In 1869 a new entrance lock was made for the East India Docks, and two years ago the directors of the East and West India Dock and the London and St. Katharine Dock Companies, as united under the Act of 1888, decided to keep pace with the times, and to adapt the West India Docks, whose use had partially ceased, to recent progress in shipbuilding. Plans were accordingly made by Mr. Robert Carr for a new entrance lock into the Blackwall basin from the river, with new cuts from the basin to the two docks. As Mr. Carr unfortunately fell ill, he was appointed consultative engineer, and Mr. H. F. Donaldson was entrusted with the carrying out of the work. The new lock is 480 by 60 ft., with a uniform depth of 30 ft. over the sills. Messrs. Lucas & Aird contracted for the building operations; the pumping machinery being supplied by Messrs. Easton & Anderson, Limited, and the hydraulic machinery for moving the gates by Sir W. G. Armstrong, Mitchell, & Co. We are informed that the lock-gates were constructed by the Thames Iron Works and Shipbuilding Company, after Sir Alexander M. Rendel's designs; and it is stated that the original estimates of 200,000*l.* are not exceeded though some costly additions were made to the first plans, including further provision for the hardwood trade. The Millwall Docks, south of the West India Docks, were opened in 1868; in 1882, the East and West India Dock Company began the construction of the docks at Tilbury.

WE understand that the St. Pancras and Marylebone Vestries have agreed to share the cost of a sanitary improvement that should tend to a highly desirable object—the purification of the Regent's Canal. The St. Pancras Vestry will supervise the making of a new sewer for diverting the drainage of the Zoological Gardens from the canal into the main drainage system. Nash projected the canal when, in 1811, he planned Regent's (formerly Marylebone) Park, the engineer being James Morgan, who also laid out the park from Nash's designs. The

canal passes for about nine miles from the Grand Junction Canal at Paddington to the Thames at Limehouse. Begun in October, 1812, it was opened to the river on August 1, 1820. It has two tunnels—beneath Maida Hill and Pentonville—twelve locks and a tidal lock, the total fall of the water-level being nearly 95 ft.

MR. C. W. WHALL has had on view at Powell's Glass Works during this week a pair of windows about to be fixed in the Church of St. Clement, Bournemouth, which will be well worth seeing by all who are interested in the right treatment of stained glass. The subjects, which were dictated to Mr. Whall, are the Resurrection and the Miraculous Draught of Fishes, and the treatment, as might be expected from so earnest and individual a worker as Mr. Whall, is distinctly original and far removed from the hackneyed methods too common in modern windows. As a starting-point, Mr. Whall has clearly regarded his work as decoration in translucent material, not as picture-painting on glass. Thus, in lieu of the conventional canopies of distorted and impossible architectural detail, the heads and bases of the windows are treated with an ornamental treatment, which, though suggestive of canopy work to some degree, is, strictly speaking, but flat decoration in neutral tones. Careful attention to lead lines and white glass, a rigid avoidance of anything resembling landscape, and a well-considered colour scheme go to make up an admirable attempt to get free from the trammels of conventionalism, and to produce a decorative result worthy of the fine church in which the work is to be placed.

IN Denmark a German company is busy turning the island of Fanø into a bathing-place. The typical *Kurhaus* of the foreign watering-place has already been opened, and hotels are being erected. The *Kurhaus* type of building, besides containing a large ball-room, generally has a suite of reading and refreshment-rooms, and the great point in the planning seems to be its adaptability to large or small numbers of visitors, and the possibility of using it for all manner of purposes. It is supposed to combine the advantages of a social club, a mutual dining-room, a free library, and a theatre; and in wet weather it is turned into a children's play-room. A small entrance-fee makes it a paying concern. There seems to be a regular system in laying out a continental watering-place on German lines: an esplanade on the sea-front, a hotel quarter, hot baths, bazaars, a large public park inland, with playing-grounds, music-stands, *cafés*, &c. At Fanø a Corso and Rotten Row are arranged for, and the lodging-house and villa quarters are kept severely distinct. The authorities retain the power to veto an ugly design (or what they consider such), as well as a bad construction; though when we consider what passes for picturesque in modern German villa architecture, one may fear that the æsthetic mercies of a watering-place under German management will be small indeed.

THE last word about Troy may possibly never be said, but in Dr. Dörpfeld's book just issued ("Troja, 1893,") we have probably the final official report of systematic excavations. The book in question is the necessary sequel of "Troja," and "Ilios," and in some respects of "Tiryns" and "Mycenæ." It contains a detailed account, with plans and illustrations, of the work carried on mainly at Mdmé. Schliemann's expense during 1893; work carried out by Dr. Dörpfeld in memory of Dr. Schliemann. The programme planned and executed was fourfold:—1. To complete the investigation of the second stratum, especially with respect to the fortifications on the west and north; 2. To fix the order of the various strata by excavating vertically an untouched portion of the Acropolis, and

noting with absolute accuracy the character of the objects in each stratum; 3. To investigate the tombs of the various strata with a view to noting the history of the development of the City of Troy; 4. Most important of all, to lay bare a large portion of the sixth stratum (counting upwards), being that stratum in which at the last excavation there were discovered, not only the remains of important buildings, but fragments of Mycænæ pottery. Dr. Dörpfeld was assisted throughout by Dr. Max Weigel (in the interests of pre-historic archaeology), Herr Wilberg, as architect, Dr. Alfred Brückner, as general archaeologist; while Dr. Brückner furnished a supplementary chapter on the graves investigated, and also one on Trojan ceramics.

SINCE Vienna has been transformed into a "Greater Vienna," the alteration of its Building Act of 1883 was only a question of time. Temporary amendments were at once made in 1890, and at the same time the authorities, with very good sense, invited the Vienna Society of Architects and Civil Engineers to frame the new Bill in accordance with the technical requirements of the day. The special committee in charge of this responsible duty has been at work for three years, and we understand that the results of its labours are being received with unanimous approval by all concerned. The proposed code is divided into four parts, with 963 clauses; but the whole of these are considered to be to the point, though in many cases novel, and probably constituting a substantial reform in building legislation. One of the principal difficulties has lain in the difference of requirements for different parts of the city, the area being divided into "zones."

OUR German contemporaries have already actually commenced describing the architectural exhibits of the Berlin *Salon*, which was opened in May. It appears that they are well satisfied with the quantity and quality of the work shown, and thoroughly appreciate the efforts of the new "Vereinigung Berliner Architekten," who managed to bring the drawings together, and get them well hung. Up to this time the Architectural Room at the Berlin *Salon* has been generally a farce, but this energetic society has taken the matter in hand, and has brought about a beneficial change. It is true that the drawings shown are not all freshly prepared for this exhibition, and that a number of old friends from competitions are on the walls. There is, however, already a noticeable improvement, especially as nearly all the leading German architects are among the exhibitors. Messrs. Ende & Boeckmann show some large business premises; Herr Wallot some interior views of his new Houses of Parliament, drawn by Messrs. Pfann and Rieth; Messrs. Crémér and Wolfenstein are represented by a design for a synagogue; Messrs. Bruno Schmitz, Otzen, Schwegelin, Seeling, and Messel, of Berlin, as well as Herr Hauberisser, of Munich, Herr Eggert, of Wiesbaden, and Herr Schreiterer, of Cologne, have all sent drawings. Among the competition drawings which take a prominent position are several sets of designs for the proposed Provincial Museum at Berlin and the Town Hall at Elberfeld. Among the many church designs those for the Garrison Church at Dresden and the Memorial Church to the Emperor William at Berlin are the most important. Herr Seeling's model for the Rostock Theatre represents this class of work. We must congratulate the "Vereinigung," and hope next year's show will be a yet better one.

A LETTER of Messrs. Ende and Boeckmann, of Berlin, to our contemporary the *Deutsche Bauzeitung*, gives us some interesting particulars of the effects of the late earthquakes on the new public buildings these architects have erected at Tokio.



We refer to the earthquake that passed over Japan on June 20 last. It seems that the shock lasted no less than four minutes and fifty seconds, and that the buildings rolled perceptibly. Whilst all the other brick buildings suffered badly, Messrs. Ende and Boeckmann's blocks apparently withstood the shocks without showing a crack. This escape seems to have been mainly due to the precaution of tying in all the brickwork with iron bands, both horizontally and vertically, no part of the building being omitted; and, further, in building, the exterior slightly inclined inwards. The walls are built unusually thick. The designs purposely showed no gables, and in vaulting very narrow spans were arranged for. On referring to official information regarding the earthquake we hear that at Tokio and Yokohama together no less than 4,551 buildings were damaged, and that sixty-one persons were killed and 428 hurt by falling houses. Thirty-two buildings collapsed completely, and eighty-one were practically razed; five bridges gave way. Of course, the majority of these buildings were of native construction, but these, as usual, apparently withstood the shock far better than the average "European" structure.

THE death of Mr. Wyatt Papworth, after his brief tenure of the office of Curator to the Soane Museum, will be widely regretted. The appointment was one for which he was peculiarly fitted, and which it was hoped would afford him some years of comparative leisure in an honourable position, after his many years of arduous labour on the "Dictionary of Architecture." The latter work forms the chief monument of a career of useful and unostentatious study and labour; and while we could not help expressing our opinion, some time since, that the carrying on of such a work as the Dictionary ought to have been a matter of co-operation and division of labour, it must be admitted that as the work for the most part of one man, it is a most remarkable production, and wonderfully accurate in the main. Mr. Papworth was essentially a student, and possessed a mine of information on various curious and out-of-the-way departments of architectural history, and in this respect his place will not be easily supplied.

#### THE ARCHITECTURAL ASSOCIATION: TWENTY-FIFTH ANNUAL EXCURSION.\*

Wednesday.

A LONG drive through heavy showers of rain formed the first experience of the excursionists on this day on their journey to Mells, but further unheeded incidents were useful in relieving the tedium of the journey. The pole of one of the brakes was smashed a short distance from Wells, necessitating an irksome delay for the majority of the party. The minority went on, and, by spending some time at the little village of Stoke St. Michael, where there is a picturesque inn, reached the first stopping-place only a little before the second party. This was at Leigh-upon-Mendip, which, although not on the original programme, was well worthy of the time spent in examining and sketching the church of St. Giles, which, although small, with three-bay nave and aisles and chancel of considerable less height than the nave, has considerable interest. The western tower is of excellent design, even if not to be ranked in point of size with the first-class towers of Somerset, but resembling rather the type seen at Kingston and Huish Episcopi. The wooden roofs are good in form and detail, and old carved bench-ends and some ancient stained glass in the tower window add to the general interest. A very fine slab of Purbeck marble, exceptional both in size and beauty, forms the altar, having been discovered during some comparatively recent excavations under the north chancel aisle, where it is supposed to have been hidden.

Before reaching the village of Mells, a halt was made at the seat of the Horners, Mells Park, where the architecture of Sir John Soane was, to the visitors, of far less interest than the fine collection

of works by Burne Jones and Rossetti—studies, oil-paintings, gesso, and embroidery, by the hands, or after the designs, of these great pre-Raphaelites, furnishing a treat to the excursionists, which came as a surprise to all, and a warning to those whom the external appearance of the house and a heavy shower almost induced to hurry away without the delay of entering. Arriving at length at Mells itself, luncheon was first disposed of, and a couple of hours was spent at the church and manor house, both altered for the worse since they were visited by members of the Association fifteen years ago.



The church of St. Andrew has been most ruthlessly "restored," the beautiful oak pews of Charles I. date having been swept away, some stuck up in meaningless fashion against the walls, although judicious repair might have preserved them till the present time of their full appreciation, had not the Gothic iconoclasm of the rector wrought for ever the incalculable mischief which filled all those who had formerly seen the church unrestored with feelings which might have found unpleasant vent if the perpetrator of the vandalism had not departed to the far east to study Sanskrit. The manor house, as it now stands, though still picturesque and interesting as an example of Domestic work which an extant document of the reign of Henry VII. mentions as having been built "within the mind of man," possesses but a shadow of its former greatness. One wing only remains of the former H or E shaped plan, the remainder having been pulled down by a former owner about 150 years ago to furnish material for the building of stables to the great house in Mells Park. The existing portion has been greatly altered, and its original planning obliterated by successive alterations to fit it for a farmhouse, a boys' school and a rectory. The chimney corner in which "little Jack Horner" of nursery fame is said to have sat and pulled out the historical plum of 10,000, still remains, but little else within the house is original. Mells has recently added to its attractions a real ghost story, a spectral funeral having been clearly seen by a local hard-headed Radical cobbler and two companions near the cross-roads traditionally known as St. Mary's grave.

On the return journey a halt was made at Shepton Mallet, with its picturesque market square and cross, the latter erected by Walter and Alice Buckland in the year 1500, but rebuilt within the present century. The original charter for the market was granted by Edward II. in the eleventh year of his reign, but the town is mentioned in Domesday with a reference to the pastures, from which the original name of Shepton was derived. The distinguishing appellation was borrowed from the Barons Mallet, lords of Shepton in the reigns of Henry I. and II. During the bloody Western assizes, after the Duke of Monmouth's rebellion, the town of Shepton Mallet suffered somewhat severely,

thirteen of the inhabitants being convicted for their participation in that ill-fated enterprise. The church of SS. Peter and Paul, some sketches of corbels on the nave-piers of which appeared in the last issue of the *Builder*, is chiefly remarkable for its western tower, with the picturesque capping of unfinished spire and lead roof. Internally, interest is centred in the magnificent wooden ceiling of the nave, containing 350 panels, all of which vary in detail. The stone pulpit, of Late Fifteenth or Early Sixteenth century date, is worth noticing, with its introduction of Renaissance detail in Perpendicular work. The pews and choir-seats, recently carried out from the designs of the late J. D. Sedding, attracted considerable attention and some timid and halting criticism. Little heed was paid to the old Grammar School, situated northward of the church, though the original buildings of the establishment founded by Sir George Strode and others in 1639, have a simple picturesqueness that is not unworthy of study. A pleasant drive through the valley-road, by Croscombe, completed this day's proceedings.

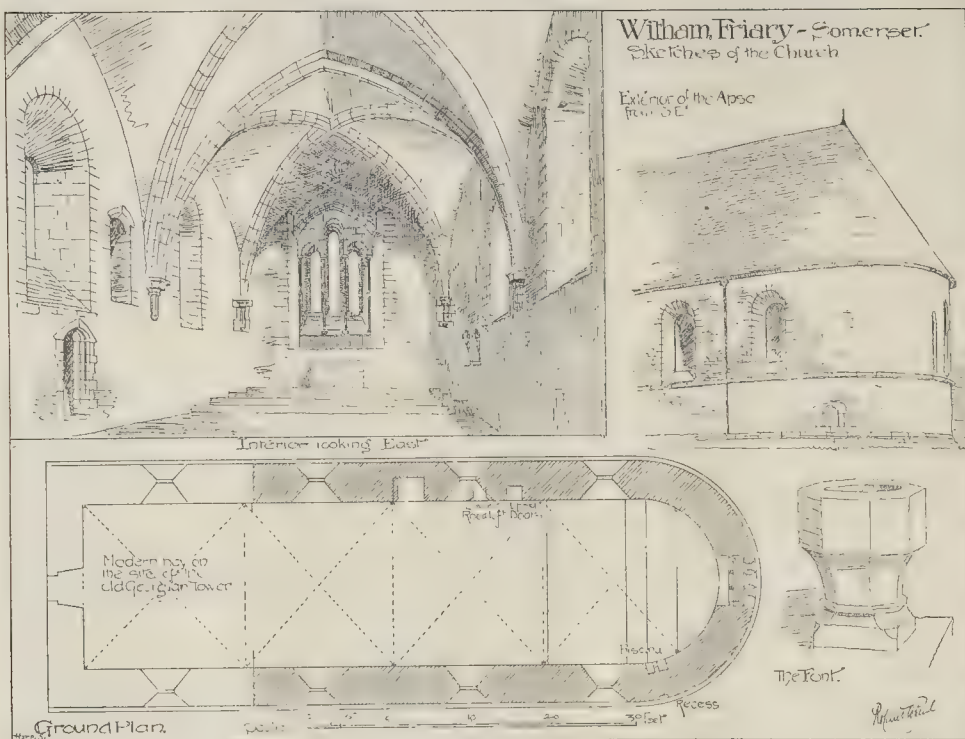
Thursday.

The refusal of the Marquis of Bath to allow any sketching at Longleat except "outside the gardens," determined the leaders of the excursion party to abridge the time allotted in the original programme to that house, and to make a longer stay at Frome, or Froome-Selwood as it was originally named until the railway nomenclature, with its usual topographical inaccuracy, was adopted. The Church of St. Peter was first visited, which has received the addition of much modern work during the last quarter of a century, chief amongst which are the west front by Mr. Gough, the well-known Via Crucis, arranged on the ascent of the hill on which the church stands, the decoration and reredos in chancel, and the recently-erected rood-screen from the designs of Mr. C. E. Kemp, with carved figures from Ober-Ammergau. The visitors were met by the vicar, who pointed out the chief points of interest in the church, including the unusual piscina which served for the altar of the ancient rood-loft, and some good fragments of Saxon sculpture, which may possibly be part of the work of Aldhelm, Bishop of Sherborne, who founded the church and also a monastery dedicated to St. John Baptist in 705 A.D., the church of which remained to the twelfth century,



although the monastery was plundered by the Danes and the monks dispersed. The church is of further note as the burial place of Bishop Ken, whose curious wrought-iron grave monument is to be seen external to the east wall of the chancel, with

\* Concluded from p. 115, ante.



a canopy of stone designed by Mr. Butterfield. The visitors greatly enjoyed the exhibition of the fine collection of chalices, including that of Bishop Ken and other altar vessels, as also some magnificent vestments and embroidery shown to them by the vicar. Leaving the church, the party were taken by Mr. Singer to his well-known metal-working shops, where especially the various processes of bronze-casting were illustrated by specimens of work in all the various stages, from the model to the finished object. A fine collection of Belgian processional crosses, and several methods of artistic metal-working, filled up the all-too-brief time which the excursionists were able to spare.

A charming drive brought the party through the woods to Longleat House, of which a description and views of the principal fronts appeared in the *Builder* last week. The members were conducted through the principal show-rooms of the house in stereotyped tourist fashion, and thus briefly and superficially saw the principal art treasures of the interior. Thus an hour's stay only was made at Longleat instead of the three originally allotted in the programme, and the party then went on their way towards Stourhead, stopping *en route* at the village of Horningsham for luncheon. The church here, though small, is exceedingly beautifully situated in the midst of the picturesque scenery of the village.

Some difficulty was experienced in obtaining entrance to the house at Stourhead, the place being partly dismantled and in charge of a house-keeper, who was not at all disposed to admit the party, and only did so after keeping them waiting outside for some time whilst she attended to the baker. Stourhead was erected chiefly from the designs of Colin Campbell, the author of "Vitruvius Britannicus," on the site of a former castle built by John de Stourton, whose family held the place till it came into the possession of the Hoares. Like all Campbell's work, the design is, to modern taste, flat and uninteresting in general, although the detail leaves little to be desired in refinement. There is little to be seen internally beyond the remaining pictures, and these are chiefly interesting as evidences of past taste in methods of drawing and painting.

Leaving the house without much regret, the party set off to walk to Alfred's tower, where it had been arranged that the conveyances should be

again met. A short glimpse at the picturesque church, with its monuments to the Stourtons and Hoares, and a glance at the beautiful High Cross of Bristol, which has been removed from that city to this quiet village, and the excursionists proceeded through the woods and pleasure-grounds of Stourton or Stourhead, giving scant attention to the grottoes and temples with the prospect of a train to be caught and half-an-hour to walk a good couple of miles up Kingsettle Hill, the scene of several memorable contests in early English history; for here in 566 A.D., Cenwalh, King of the West Saxons, encountered an army of the Britons, whom he defeated with great slaughter and compelled to retreat to Petherton. In 1001, an obstinate and sanguinary battle was fought between the Danes and the Saxons under the command of Cola and Edsige, in which the latter were defeated, and in 1016 another engagement took place between the Danes, under Canute and Edmund Ironside, when the Danes in their turn were the vanquished. Thus through these early battle-fields, the excursionists hurried on to the trysting-place where Alfred's Tower marks the spot on the summit of Kingsettle Hill, where in A.D. 879 that King, issuing from his retreat in the isle of Athelney, erected his standard and gathered his forces for his successful battle against the Danes at Edington. So the excursionists, after their battle against time and hills, gathered again on Kingsettle Hill, and joined the brakes for a mad rush to Witham Station, which, and the train, were successfully captured, and Wells once more safely reached after a day rich in beautiful scenery, though somewhat void of architectural interest.

#### Friday.

After some delay to allow of the photographers of the party taking their groups, the excursionists started for Pilton, where the Church of St. Mary, though much "restored," is still of considerable interest, both in itself and from the picturesque situation in which it stands. The two-storied arrangement of windows in the nave and chancel is peculiar, and its origin curious. There is one aisle only to the north, and the nave arcade has a range of clearstory windows as a matter of course. To match these the designer put a similar range of windows in the south side of nave, and then follows naturally a

lower range, and the nave is two-storied. The chancel follows suit, and so is evolved the peculiarity, quite unconnected with any idea of two floors. The screen in the north aisle is one of those instances of the use of Renaissance detail in Perpendicular work, undoubtedly due, not to subsequent alterations or additions, but to the employment of some of the foreign carvers, who came over here from Italy in the reign of Henry VII. Some portions of ancient embroidered vestments are preserved in the church, and were exhibited to the visitors. The barn built here by the Abbots of Glastonbury attracted much attention, and still remains in useable condition. It is similar in form to the barn at Glastonbury illustrated by us last week, and its detail is rich and good.

From Pilton the excursionists went on to Evercreech, where there is little beyond the market cross and the magnificent tower, but this latter is worth going many miles to see, for, as may be seen from Mr. Mitchell's sketch in our last issue, it is, if not the very finest, at least among the finest examples of its type. It is 20 ft. square on plan at base, and its height is variously given at 130 to 135 ft.

During their stay at Evercreech, some of the members took the opportunity of seeing in progress the modelling of Mr. Bates' statue of General Roberts.

After Evercreech, the party finished up the day's work at Bruton, a quaint and picturesque town, full of bits for the sketcher. The old houses, the remarkable series of wrought-iron inn signs, and the medley of roofs and buildings, rising from the banks of the Brue which runs through the town, provide an amplitude of subjects almost sufficient to keep one away from the church, interesting as this is, with its western tower, and also a second tower in the unusual position, shown in our illustrations last week, over the north porch. The church of St. Mary has an ancient monastic history, a Benedictine Abbey having been founded by Algar, Earl of Cornwall, in 1003, which was succeeded after the Conquest by a priory of Augustinian canons founded by William de Mohun in the reign of King Stephen. The tower is supposed to have been built from the benefactions of a mercer of Bruton, the father of Prior Hampton, who gave an equivalent of 5,000*l.* to the church in 1428. The church



St. John's Church,  
Glastonbury.  
Tomb, now in St. Aise's  
of the Nave, said to  
have been brought  
from the Abbey ch.



was, it is said, built about 1450—of course, on the site of the older priory church, as the crypt, into which some of the members descended, shows Transitional Norman work, and is undoubtedly part of the church built by William de Mohun. The chancel, ceiling, and the altar-screen are remarkable specimens of plaster decoration of the date 1720 A.D., and certainly indicate foreign, probably French, workmanship. From the position of remains of stairs there seem to have been two rood-screens in the church, but both have vanished. The old "hospital" or almshouse, founded about 1618, by Hugh Saxey, auditor to the household of Queen Elizabeth and James I., and the buildings of which were completed about 1636, and are built around a quadrangle, is now less interesting than formerly on account of modern "restorations" and improvements, but it still retains enough of its old charm to justify a visit. The return to Wells was made by way of Shepton Mallet and Crosscombe.

Friday evening being the last on which the excursionists were gathered together, the committee for the next year was, as usual, elected after dinner, when Mr. H. D. Searles-Wood, who has for many years acted as hon. secretary to the excursion, expressed his desire to be relieved from the duties, in consequence of the increase of other calls upon his time. The idea of losing their genial, hard-working, and experienced secretary naturally did not commend itself to the excursionists, and it was accordingly, on the suggestion of Mr. Albert Murray, arranged that, instead of retiring, Mr. Searles-Wood should have the assistance of a colleague; and Mr. W. Talbot Brown, of Wellingborough, one of the oldest and most regular members of the excursion, was unanimously elected as joint-secretary with Mr. Searles-Wood. A better arrangement could scarcely be devised, as the qualifications of the two gentlemen now elected joint-secretaries form a combination of abilities which it would be impossible to find in any other two members.

#### Saturday.

The last morning of the excursion found a slightly-reduced number of the members driving to Glastonbury to complete the programme of the excursion by visiting and studying the remains of the famous Abbey, which forms No. 3 of the *Builder* series of "Abbeys of Great Britain," and which was fully described and illustrated in our issue of the 4th instant. The ruins of the Abbey churches, the abbot's kitchen, and the tithe barn were visited, as were also, by some of the members, the George Inn, the Abbey court-house, usually known as the Tribunal, and the parish churches of St. Benedict, a sketch of the tower of which we gave last week, and St. John the Baptist, the latter with a tower whose outline is considerably less graceful than that of the former. Thus ended a pleasant excursion, not too full of work, but very enjoyable for the beautiful scenery, and fairly fortunate in the matter of weather.

#### SANITARY INSPECTORS' ASSOCIATION: ANNUAL CONFERENCE.

THE members of this Association visited Ramsgate on the 17th inst., in acceptance of an invitation to hold there the annual summer Conference, forwarded to Sir Benjamin Richardson by the Mayor of Ramsgate (Mr. Alderman Blackburn). The President, Sir B. Richardson, was detained in Paris, his place being taken by Mr. Thomas, the Chairman of the Council, supported by Mr. H. Alexander (ex-chairman), Mr. Raymond (treasurer), Mr. S. C. Legg (hon. sec.), Mr. Tidman, C.E., Mr. Wootton, Mr. Dee, Mr. Fairchild, &c., and a large number of affiliated members from Liverpool, Manchester, Leeds, Bristol, Stafford, Merthyr Tydfil, Reading, Maidstone, and other provincial centres. The visitors were received on arrival by the Mayor, who was accompanied by Mr. Alderman Emmett, Mr. Seebag Montefiore, J.P., Mr. W. A. Valon, C.E., the Borough Engineer, and the Conference was at once constituted in the large room of the Royal Hotel, which was completely filled. After a cordial welcome had been offered by the Mayor, Mr. Thomas was called upon to preside. After complimenting Ramsgate, to which he was no stranger, on the great natural advantages which rendered it, in his opinion, one of the healthiest of all health resorts, the Chairman referred to the insecurity of tenure of office, of which the majority of sanitary inspectors had to complain. All honest and capable men should have security of tenure in their offices, should not be subjected to be reprimanded or suspended for declaring un-



pleasant truths, and should not be removable except with the consent of the Local Government Board. They had a good inspector at Ramsgate (Mr. Millard), whose worthiness was completely recognised by his Corporation, and they would never dream of removing him for fearlessly exposing any evil, but it was not so with the majority of inspectors in London and in many provincial centres.

The Medical Officer of Health, Dr. T. G. Syam, had forwarded from Baden-Baden an interesting paper to Alderman Emmett, the Chairman of the Sanitary Committee, who was now called upon to read it. Ramsgate had learned enough of the value and necessity of good sanitation, said the Medical Officer of Health, to make it welcome cordially the visit of the Sanitary Inspectors' Association, the members of which he hailed as "comrades-in-arms." They had met together in various inland centres of industry and business, but in a seaside town like Ramsgate, they would find the conditions totally different. The authorities had two populations to provide for, one resident and fairly constant in number, the other a floating population as changeable as the weather. Fine weather brought them suddenly in great numbers, and a week's rain would send them as suddenly away again. In the winter months and the greater part of the year the town had only a population of 25,000, but in July and August one of 50,000. If they imagined London with 4,306,000 in December and 8,612,000 in July they might realise some of the difficulties of Ramsgate. A supply of water more than sufficient for the smaller population might be totally inadequate for the larger one, and the drainage and means of removing street refuse would be similarly deficient, unless very special arrangements were devised to meet the difficulty. Another special difficulty was the constant danger they had to run from the importation of infectious disease, and he regretted to say it was at times consciously imported. Two years ago, when scarlet fever was rife in London, thirteen distinct importations of the disease had been traced in five weeks, and there was reason to believe that other health resorts, within easy distance of London, were equally unfortunate. Isolation in infectious cases was so expensive in a seaside town as to be almost impracticable, unless the patient was willing to go to the town hospital, which was seldom the case; but as a rule the friends of patients preferred to send them to their homes, and that could be done by means of ambulances, which were carried on trucks. The overcrowding difficulty was an embarrassing one, and it was not among the humblest visitors that the evil most prevailed. Well-to-do persons would hire one or two rooms for a large party, and on the supposition that they would only be occupied for sleeping purposes, as many persons as possible were crowded into each room, with the result that in wet weather the rooms were dangerously overcrowded for many hours at a stretch. The residents, too, anxious to make the most of their houses during the season, often crowded into a single room—not unfrequently a cellar below ground—and the practice constituted a serious danger to the public health. Another difficulty was the tendency to exaggeration, through which the occurrence of one or two cases was magnified by rumour into the outbreak of a dangerous epidemic. Not long ago it was alleged that an epidemic of diphtheria had broken out in the town, when at that very time there was not a single case of diphtheria throughout the Isle of Thanet, and when the zymotic death-rate of the previous quarter was only 0·7 per 1,000. It was only the natural advantages of situation possessed by Ramsgate that enabled the authorities to contend successfully with all their difficulties. The drains had a natural fall which permitted of the sewage being carried by gravitation well into the strong tideway, to disappear promptly in the Channel. They had pure air on every side, coming laden with ozone fresh from the sea, and from the land side unspotted by the noxious fumes of factories. They had close to the town an abundant source of water supply from the chalk, supplying water whose purity was above suspicion; and they had the advantage—not a small one—of municipal authorities acting always together in the most cordial spirit. The sanitary inspector's share of the work was particularly difficult and important, and it required the exercise of much tact and patience as well as experience. The visit of the Sanitary Inspectors' Association to Ramsgate that day could not fail to further cement the good feeling already existing between the various officers of the borough and the members of the Corporation.

The Mayor supplemented the paper by a few

figures with regard to the outfall and the means adopted for flushing the drains. By lowering the water of the inner basin a single inch they were able to get a tremendous flushing power at the outfall, the surface of twelve acres giving them for every inch in depth 1,200 tons of water, which could be put on in a very short space of time. It was, perhaps, the greatest flushing power in the world. They had not spent 50l. on the new drainage system in seven years.

Mr. Bland (Barton) proposed, and Mr. Worrall (Liverpool) seconded a vote of thanks to the Corporation for its hospitality, to Dr. Syam, for the paper, and to Alderman Emmett. The Chairman having put the resolution, which was carried by acclamation, said that the question of overcrowding was a serious one. Each person should have at least 600 cubic feet of air, and if a by-law to that effect were compulsory it would be a great blessing to all seaport towns.

The Alderman having replied, an address was delivered by Mr. W. A. McIntosh Valon, C.E. (past President of the Society of Engineers, &c.), in which the system adopted to give the town a supply of good water, and the means by which an effective system of drainage had been secured, were described. Up to 1877, the water supply of Ramsgate was in a by no means satisfactory condition, the company in whose hands the business was, only giving a supply which was not simply intermittent, but was unable to reach the upper levels in the town until late in the afternoon, when the valves in the lower mains had been closed. This crude method was so unsatisfactory, and must prove so dangerous in case of an outbreak of fire, that the local authorities at last, in 1877, resolved to buy the company out and to hasten on a constant supply. The headings in the chalk, which at that time only extended to 600 yards, were lengthened from time to time, until they had reached nearly two miles, the surrounding district as well as the town itself obtaining by this means the blessing of a constant and efficient supply. They had built at the highest point in the neighbourhood a tower 60 ft. high surmounted by a tank capable of holding 250,000 gallons of water, which, being connected up to a pumping-station, and, when necessary, to the lower level mains, had given a remarkable immunity to the town from serious losses by fire. One or two well-drilled firemen were able, with a hand-barrow, a flexible screw hose, and a hydrant key, to subdue in a short time fires which, under ordinary circumstances, would have caused great mischief. With all the costly apparatus necessary in the London system of divisional fire-stations, not a tithe of the efficiency was obtainable that could be obtained from a common cast-iron main, under an unvarying head of water, such as they possessed at Ramsgate. This high pressure, combined with the abundance of the supply, furnished an easy means of effectually flushing and cleansing all the main and subsidiary drains. The water was known to be among the purest in England, and Ramsgate might fairly claim to have a water supply which, in point of excellence and quantity, was second to no other in the kingdom. This abundance would enable the local authorities to carry out, under favourable conditions, that most desirable reform, the supply of water for domestic purposes by meter. The progressive improvements effected in the drainage were next described, from the period of the old cesspit, before the earlier tubular drains were introduced at Dover; before such drains were either trapped or ventilated, and when the enclosed sewer-gas still forced its way through sinks into living rooms, and the attempt to keep it back by water-sealed syphons proved ineffectual, down to the present time, when well-ventilated intercepting traps more effectually protect the houses from sewer contamination. He advocated the adoption of the principle of compulsion. Power should be given to public authorities to compel every person who connected his house to the public sewer to do so in accordance with an approved plan, to be carried out under the supervision of a public officer specially appointed for that purpose. In the course of the paper the almost absolute immunity of the town from diphtheria, on account of the improvements realised, and particularly through the unrivalled power of flushing they possessed, by making the inner harbour act as an enormous millions of gallons of water along the whole line of main drain, was insisted upon, and he quoted extracts from the remarkable report recently presented by Mr. Alfred Harris, Medical Officer of Health of Islington, to show the direct relationship existing between perfect drainage and this immunity. Mr. Harris, after

an examination of some 1,300 cases of diphtheria, declared that the three great factors in its spread were school influences, defective sanitary fittings, and damp. He almost invariably found in houses where diphtheria had broken out untrapped waste-pipes to sinks, sinks connected directly with the drains, gullies in drains and other such insanitary abominations. Up to fifteen months ago Yerbury-road School possessed an unenviable notoriety through the frequent outbreaks of diphtheria which occurred. The drains were overhauled, and the many defects found therein were remedied. Then the disease disappeared, and from having the worst health record of the district, this school had now the best. It was to the great energy, foresight, and intelligence of the Chairman of the Commissioners in 1876, the Rev. Dr. Banks, and the public spirit of the local authorities, that Ramsgate was chiefly indebted for these great improvements. In concluding his paper, the Engineer referred to the extensive series of improvements which the Corporation was at the present time engaged in carrying out. These included a new sea-wall with a rising road to the west, with arches of an ornamental character, a new serpentine road to the east, having ornamental rockwork and artificial grottoes, with clusters of shrubs and recesses for sheltered seats, and underground lavatories of the most improved design. He trusted the visitors in going away from Ramsgate would take with them a conviction that the great advantages it possesses can be equalled by few if any similar places in the kingdom, and that they would place it in the front rank of all towns of its sort which are now competing for public favour.

A cordial vote of thanks was accorded on the motion of Mr. Jones (Merthyr), seconded by Mr. Clark (Broadstairs), and then a short paper was read by Mr. Tidman, C.E., in which some useful suggestions with regard to the future work of the Association were made. The time had arrived when the Association might with advantage extend the scope of its operations by arranging courses of lectures of a practical character, by increasing its membership, by the establishment of a monthly journal of proceedings, and the provision of a headquarters for the Association, which should include not only rooms for meetings and for the transaction of committee and secretarial business, but class-rooms, laboratories, and workshops for technical education. A vote of thanks having been accorded, Mr. Seabag Montefiore was called upon by Mr. Thomas to address the meeting. Votes of thanks were also accorded to the Mayor, and to the Chairman, Mr. Thomas. The visitors were subsequently entertained at luncheon at the Royal Hotel, at which the Mayor presided. The remainder of the afternoon was spent by the majority of the members in an excursion to the Goodwin Sands in the steamer *Cynthia*, and by the rest in an excursion to their environs of the town.

#### COMPETITORS.

SCHOOLS, SHEFFIELD.—The usual monthly meeting of the Sheffield School Board was held on the 16th inst., in the board-room, Leopold-street. At the last meeting of the Buildings Committee a letter was received from Mr. E. M. Gibbs and Mr. C. Hadfield, on behalf of the council of the Sheffield Society of Architects and Surveyors, with reference to competitive plans for the Tinsley Park-road school, pointing out that in view of the assessors' report and the fact that only three infants' class-rooms are shown on the plans marked "Sanglier Rouge," those plans should have been set aside, and the first place awarded to "Multum in Parvo." The committee recommended that the following reply should be sent:—"The Board regret to find that objection has been taken to their decision upon the recent competition, but I am to point out that your council has evidently laboured under the mistake of supposing that at the Board's meeting, whereas the Board's assessor was appointed, and reserved to them simply asked for advice and reserved to them selves the full power of determining which, if any, plan should be adopted. They made their selection in perfectly good faith, after very careful consideration, and they cannot alter their decision." The committee also considered a protest, signed by nine of the competitors, but they did not recommend any action thereon. Mr. Rawson, commenting on these minutes, thought the architects and competitors had very good ground for complaint. When the Board issued conditions it was only reasonable to suppose that they would be adhered to









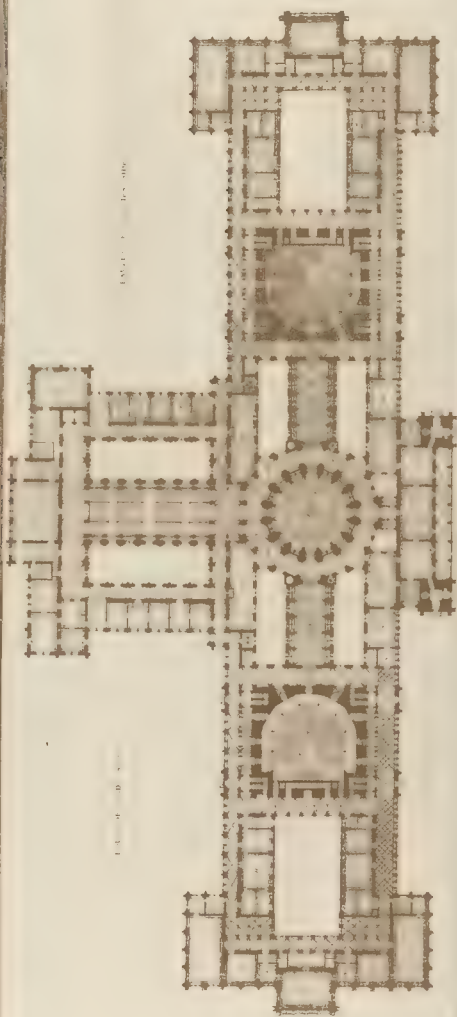


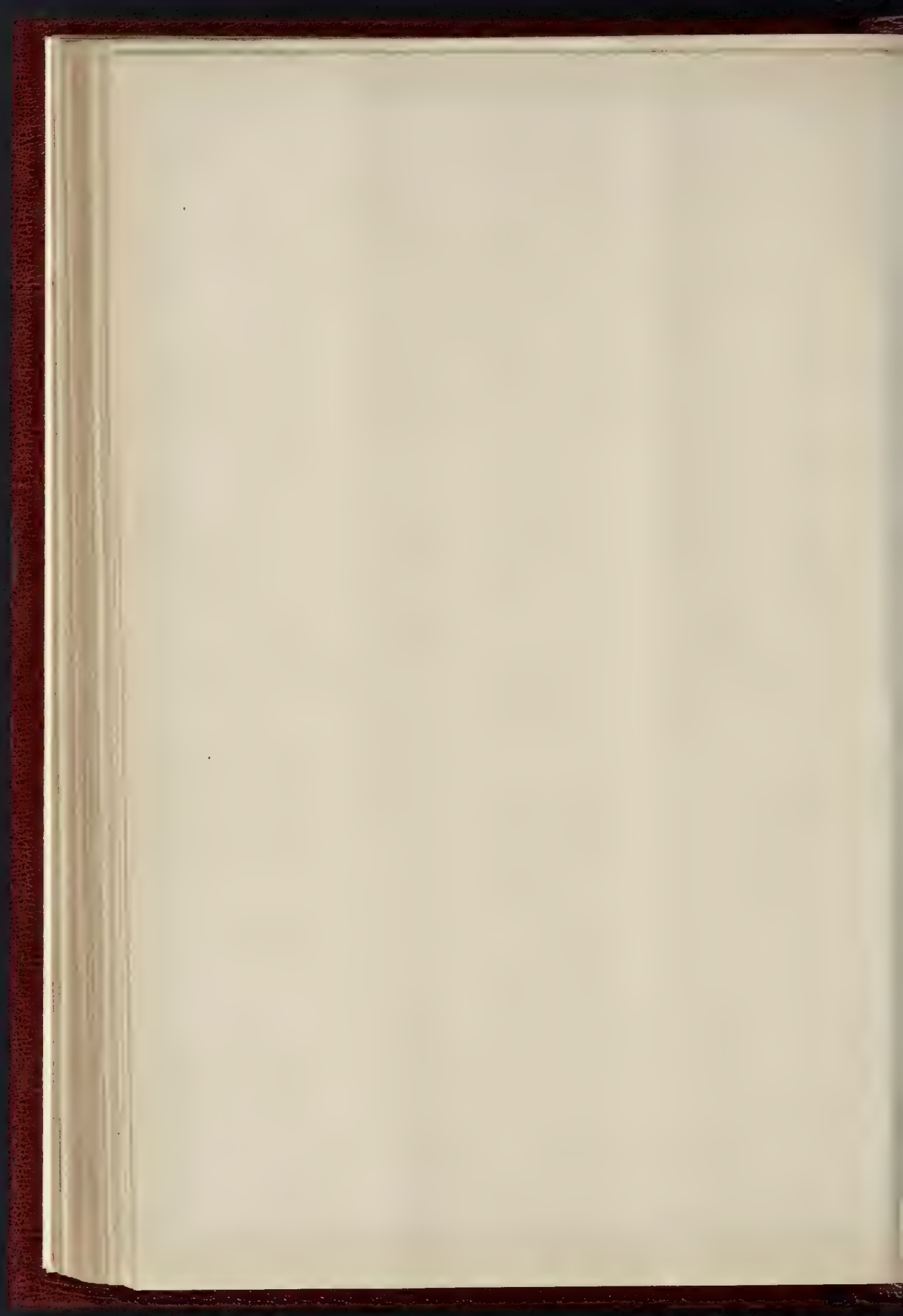
FIGURE 1. FLOOR PLAN

DELEGATES COMMON TO BOTH HOUSES

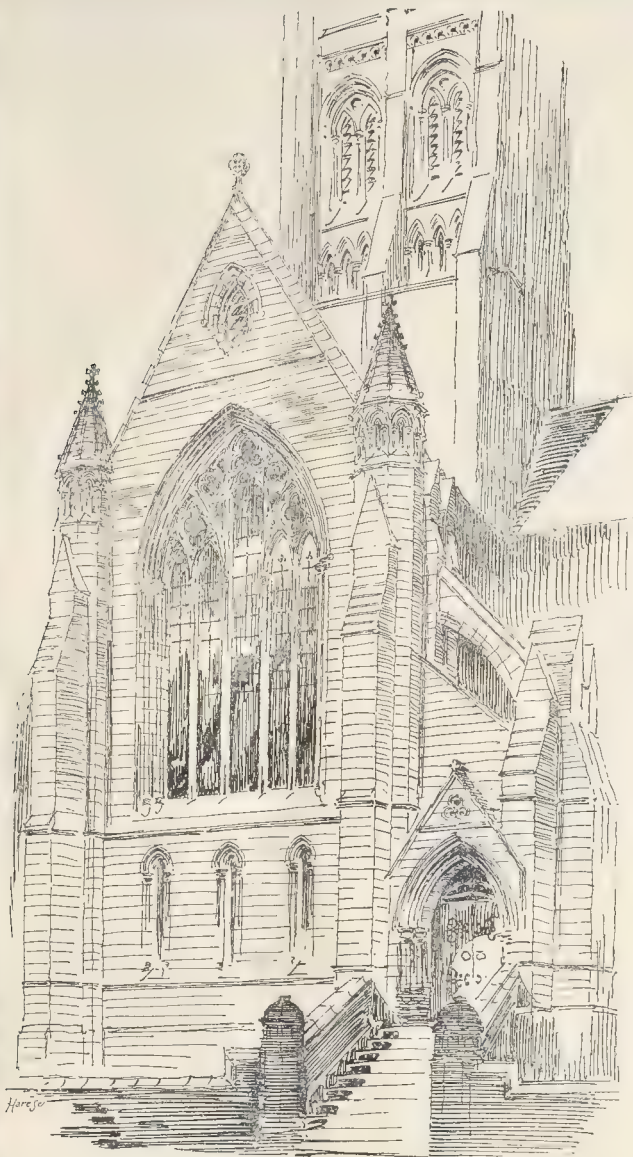
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2. HON. J. C. TOLSON	12. HON. J. C. TOLSON
3. HON. J. C. TOLSON	13. HON. J. C. TOLSON
4. HON. J. C. TOLSON	14. HON. J. C. TOLSON
5. HON. J. C. TOLSON	15. HON. J. C. TOLSON
6. HON. J. C. TOLSON	16. HON. J. C. TOLSON
7. HON. J. C. TOLSON	17. HON. J. C. TOLSON
8. HON. J. C. TOLSON	18. HON. J. C. TOLSON
9. HON. J. C. TOLSON	19. HON. J. C. TOLSON
10. HON. J. C. TOLSON	20. HON. J. C. TOLSON

CHAMBER OF DELEGATES

1. HON. J. C. TOLSON	11. HON. J. C. TOLSON
2. HON. J. C. TOLSON	12. HON. J. C. TOLSON
3. HON. J. C. TOLSON	13. HON. J. C. TOLSON
4. HON. J. C. TOLSON	14. HON. J. C. TOLSON
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9. HON. J. C. TOLSON	19. HON. J. C. TOLSON
10. HON. J. C. TOLSON	20. HON. J. C. TOLSON







Coats Memorial Church, Paisley: North Transept. (See page 134)

The chairman said he very much regretted that the architects had felt it necessary to make a protest, because there was not the least desire on the part of the board to do anything unfair. The committee were no doubt influenced by Mr. Robson's report, but they acted on their own responsibility, and were perfectly unanimous in selecting the plans marked "Sangler Rouge." He saw no advantage in reversing the decision. The Rev. H. J. Shaw said that in the conditions the word "must" was sometimes used, and sometimes the word was "should." In future it would be well to divide the conditions into those that were obligatory and those that were merely suggestive. An expression of regret was due to the unsuccessful competitors. The board, however, could not go back on their decision, because they might then be doing a greater injustice to the successful competitors. The minutes were ultimately passed.

**NEW CENTRAL HIGHER GRADE SCHOOL, BOLTON.**—At a recent meeting of the School Buildings and Sites Committee of the Bolton School Board, the award of the assessor in connexion

with the plans for the New Central Higher Grade Board School was considered. It had previously been decided by the Board that the competition should be confined to local architects, and seven firms sent in plans, for which premiums of £50, £25, and £10 were offered, the first to be merged in the commission of the successful architect, in the event of the Board accepting his designs. The assessor appointed was Mr. E. R. Robson, F.S.A., of Westminster, consulting architect to the Education Department, who made his award as follows:—1. Mr. R. Knill Freeman, F.R.I.B.A. (under the motto of "Lux"); 2. Mr. J. Simpson; and 3. Messrs. Woodhouse & Potts. At a meeting of the Board since held, this award has been confirmed, and the carrying out of the work entrusted to Mr. Freeman. The building is to be of four stories, and the style is Renaissance. The estimated cost of the work is £20,000.

\* \* \* We cannot accept any statements of the result of competitions except from public announcements or from official communications.

## Illustrations.

### BUDAPEST HOUSES OF PARLIAMENT.

**B**UDAPEST is the only Continental capital that has been able to give its legislators a site for their new home which rivals the position of our own Houses of Parliament. The Hungarians always vie with the Viennese in the erection of their public monuments, and spare no expense to give their capital something better than the Austrians. As far as the selection of this site goes, they have certainly succeeded, and if size alone count, the imposing block now being roofed in on the banks of the Danube is certainly a more important monument than Vienna's classical building on the "Ringstrasse."

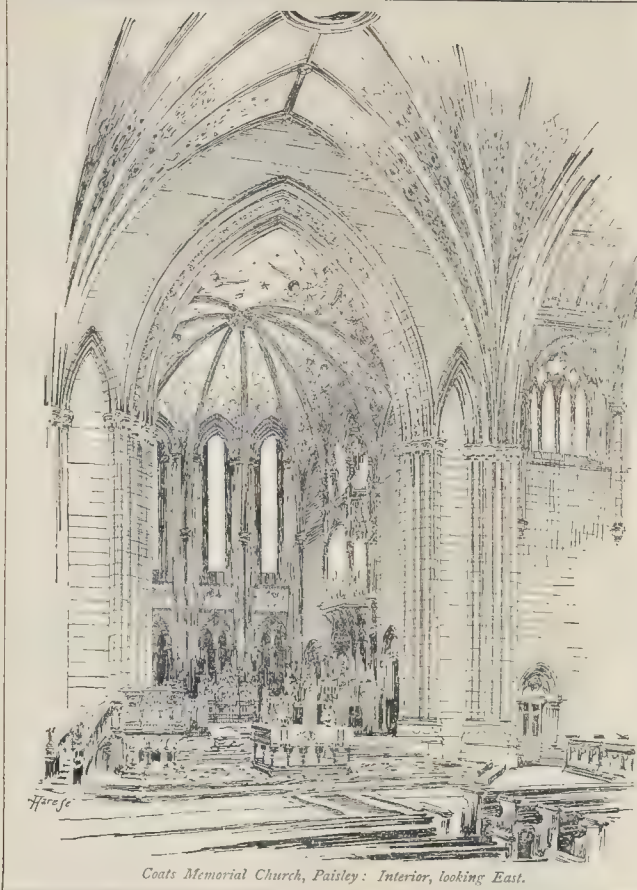
Visitors to the International Hygienic Congress, to be held at Budapest next week, will have ample opportunities for an inspection of the extensive works on which the army of masons and stone-carvers are still engaged; and Herr Steindl, the able architect-in-chief, will probably also be willing to show his interesting atelier, where the modeller is practically just as busy as the draughtsman. There will be ample facilities afforded to the Congressists for appreciating the unique aspect of the building, which on one side overlooks one of the broadest reaches of the Danube, lined with fine embankments; whilst on the other it faces a large square which serves as the main approach from the city. Just above and below the site two large bridges cross the Danube, and on the opposite bank is the rising ground, with the palaces, terraces, and gardens of the Royal residence. The square has several main thoroughfares opening into it, and the buildings around it are of the five-story tenement class, of some architectural pretension.

Contrasting with the Houses of Parliament at Berlin and Bern, which were described in the *Builder* of January and April respectively, the architect's "programme" in this case distinctly required the House of Deputies and the House of Lords to be treated as if of identical importance. Though there is a considerable difference in the number of seats to be provided, the two council chambers were to be equal in size, and equally conspicuous from without. The "Lords" wing was practically to be the exact facsimile of the "Commons" wing, though the requirements were by no means the same, and less office accommodation is required for the former. Each wing was to have its own foyer, of exactly equal importance, and both were to be extensions of a central *salle des pas-perdus*, which, with a grand staircase and a prominent cupola, was to mark the union of the two bodies and the centralisation of authority. The idea of this portion of the plan seems to have been suggested by the plan of our own Houses of Parliament. With his "programme" so distinctly defined, the architect, even if he had wished it, could have but little scope for picturesque grouping. A symmetrical plan was essential, and one may perhaps regret that a subject which lent itself so distinctly to classical treatment should have been treated in a Mediaeval style, where too precise a symmetry is out of place. Why the Mediaeval style was selected we do not know. The Hungarian admiration for everything English may have had something to do with it, or possibly the mere dislike to have anything in common with Vienna.

The Budapest central *salle des pas-perdus* is a rotunda on the first or main floor. The grand staircase by which it is approached has its vestibule in a line with it, facing the square. The staircase is curiously planned. Leaving the vestibule a single broad flight takes the visitor to a landing from which it again starts, but this time accompanied on either side by narrow flights. These three lead to the cupola. From the landing level two narrow flights, however, also return on either side of the first-mentioned flight and lead to a large committee-room, with its foyer situated above the vestibule. The result is that when leaving the cupola there are three parallel flights at the disposal of the visitor to take him half-way down, and then he must enter the single well. This neither looks beautiful, nor is it good planning. If anything, an exit should get broader, not narrower.

The *salle des pas-perdus*, as indicated above, distinctly separates the two wings, which have their own foyers on the centre-line running parallel to the Danube. Common to both wings is a suite of reception and refreshment-rooms, which take up the central position on the river front. This, we believe, is the only case where both "Houses" of a legislative institution have a mutual department of this kind. Common to





Coats Memorial Church, Paisley: Interior, looking East.

both divisions are also a number of offices facing the square, to which passage access is gained by the head of the grand staircase.

The plan shows the general contents and arrangement of the building. The Ministers seem to be exceptionally well cared for, the dimensions of their studies being almost extravagant. The refreshment and reception rooms, common to both houses, are faced by a magnificent *loggia*. English Members of Parliament would, however, scarcely appreciate the planning of this section. The approaches are not good enough, and the lavatories are badly placed and insufficient. Throughout the building, indeed, there seems a deficiency of lavatory accommodation, as in the Berlin Houses of Parliament. There is more spacious cloak-room accommodation, it is true, than elsewhere on either side of the cupola entrance, but a washstand or a water-closet are difficult to discover.

Referring to the plan of the "House of Lords" wing we find that, independent of its *foyer* approach from the central cupola, there are two main staircases from a vestibule at the further end of the block. This entrance is practically the usual one for members and officials. The vestibule and staircases also lead to the sets of committee-rooms and numerous offices on the ground-floor and mezzanine. The plan explains itself, the only remarkable point being the number of large council chambers which have been provided and the extravagant ante-room space each one receives. Altogether the amount of corridor space, ante-room, and *foyer* accommodation is extraordinary, as also the size of individual rooms. The President of the "House of Lords" is provided with three rooms, and the Clerk of the House has similar accommodation. The corridor on the river front is practically again a *foyer* in itself, and its aspect will certainly make it more popular than the official ones, which are only lighted from courtyards. There seem to

be a number of service stairs, gallery stairs, lifts, &c., which should certainly greatly facilitate the work of the ushers. The "Lords" debating chamber has seats for 300. Its arrangement will be seen in our illustration. The position of the President's seat, and the height of the "orators' tribune," are both remarkable. The gallery accommodation is exceptionally large, and certainly well planned.

On examining the plans of the "Commons" wing we find that it is in reality the simple *fac-simile* of the "House of Lords." The Deputies' Debating Chamber alone shows more accommodation for members, seats for four hundred and thirty having been provided. As will be seen from our illustration, the architectural treatment of this hall is somewhat different from the first-mentioned one, but its gallery accommodation is the same. Members of the Chamber of Deputies have their business entrance at the further extremity of their wing, and their committee-rooms and offices are again on the ground-floor and mezzanine respectively.

As regards the general dimensions of this block, its frontage is 885 ft., and the cross of the cupola is 311 ft. above the pavement. The diameter of the *salle des pas-perdus* is 65 ft.; the grand staircase measures 103 ft. by 83 ft. 6 in. The height of the floors from floor to floor is 18 ft. for the ground floor, and 14 ft. for the mezzanine. In the main floors the heights vary from 24 ft. 6 in. in the offices, to 32 ft. in the committee-rooms. These dimensions are all unusually large.

The *façades* are fully explained in the river elevation, of which we show a perspective. The material used is a national freestone, the roofing is slate and copper, and the glazing is plate-glass.

As regards the construction, the foundations proved to be interesting work. The bed of the old Danube had first to be reached, and then a layer of cement concrete, 6 ft. 6 in. deep, spread

over the whole site excepting where the courtyards are shown. Here the layer was only 3 ft. 3 in. thick. The quantities of material used were enormous, and a special testing-station was erected for the regular analysis of the cement used. The walls are mainly of brickwork, faced inside as well as out with various kinds of freestone. About forty-five millions of bricks are used on the work. The masons' materials are from the Hungarian hills; some granite, however, had to be imported. The flooring is of fire-resisting material, and the construction of the roof is of iron girder-work. The ceilings are to a great extent faced with natural wood, and there is much paneling. Hungarian tiles will be used for pavements, oak parquet for the floors. The natural wood and stone is to show everywhere, and no paint is to be used. The architect hopes to be able to get his wrought-iron work done in the country, and native artists will do the fresco and sculptural work, of which there will be much. Nothing is said at present about the date of completion, or the actual cost. The building operations will certainly not be hurried, as the block is to serve as a school for the artists and craftsmen of the country.

#### COATS MEMORIAL CHURCH, PAISLEY.

The accompanying sketches, sent to us by the architect, Mr. Hippolyte J. Blanc, illustrate this large and important church, which was opened in May of the present year. The church was erected as a memorial to Mr. Coats, a life-long member of the congregation, by his widow and family.

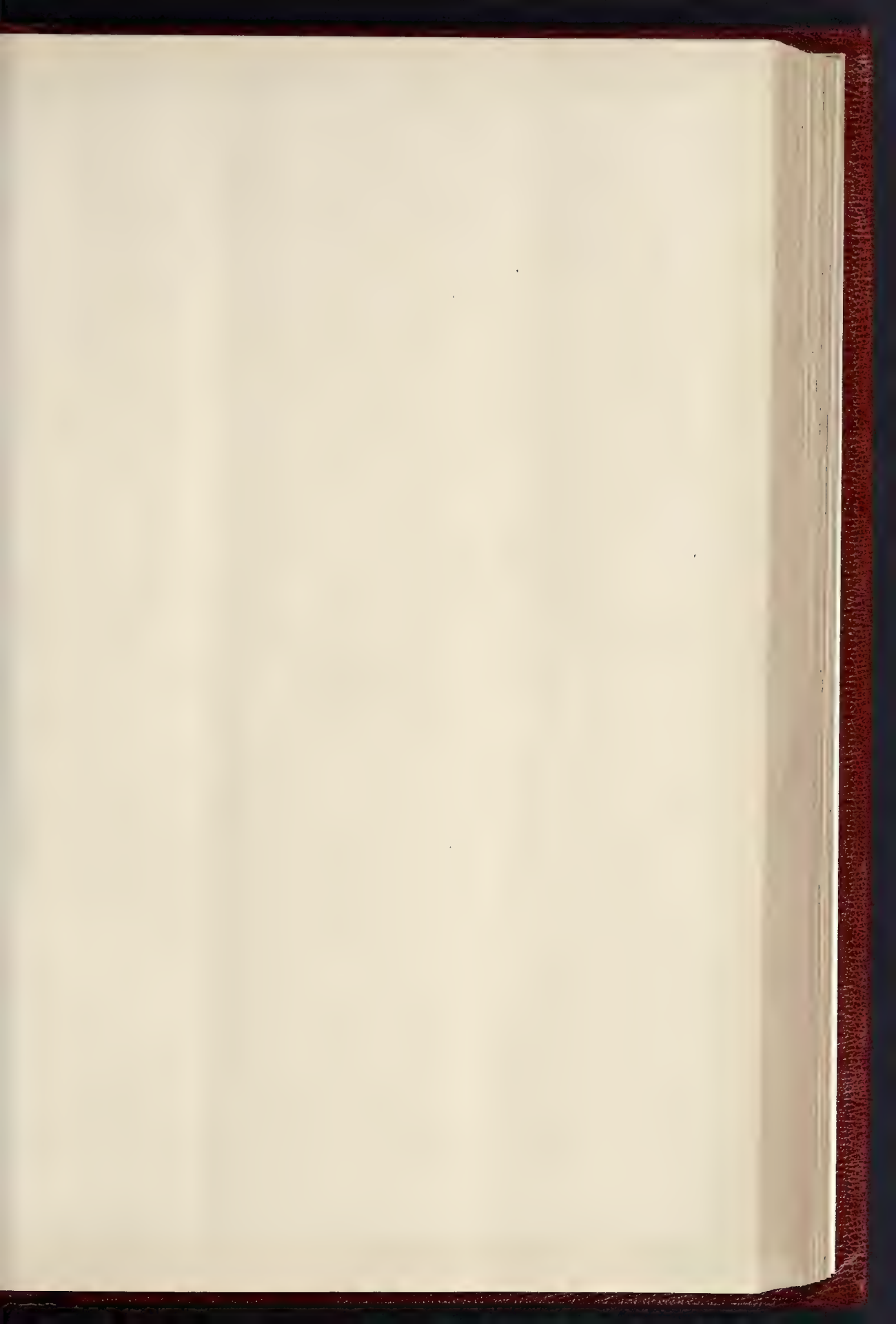
The design by Mr. Blanc was chosen in a competition, from nine designs submitted. The object of the architect has been to give the building as far as possible a memorial character, hence the "crown" treatment of the central tower, a kind of termination which has been not infrequently made use of in designs for monuments, ancient and modern. As in the original conditions it was stipulated that a large hall should be provided in connexion with the church, it appeared that on a sloping site this could be best provided under the church, by raising the latter as on a platform at the lower end of the slope of ground. This arrangement not only provides in a convenient manner for the wall, but has the effect of giving great dignity to the western entrance of the church, which is approached, as the sketches show, by a lofty and wide flight of steps, forming a striking feature in the design.

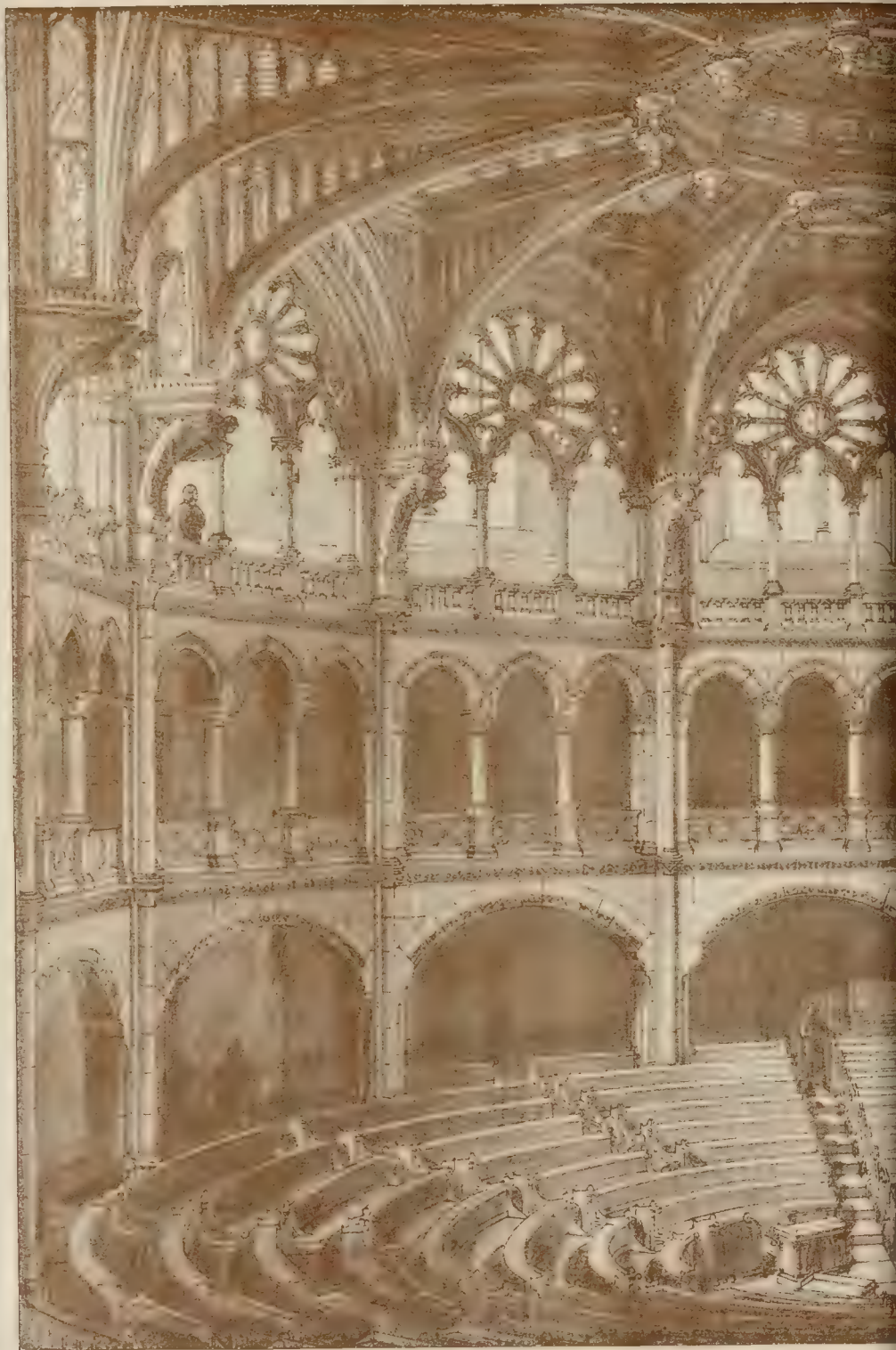
After the design had been matured in its main features, it was decided to widen the nave from 32 to 40 ft., but the transepts were retained at the original width. This rendered the plan of the crossing oblong, and the lower portion of the tower also; and in order to bring the upper portion to the square form necessary for the "crown" termination, the north and south walls had to be set back, above the roof-ridge line, in the manner shown in the general exterior view. This difficulty has been met in such a manner as to add to rather than detract from the effect of the tower. The building as a whole is a powerful and remarkable specimen of modern church architecture.

#### MR. WATERHOUSE ON THE STUDY OF ART AND NATURE.

The following remarks formed a portion of an address recently delivered by Mr. Waterhouse at the opening of the new buildings for the Technical Institution at Newbury:—"We hear much of the danger of foreign competition robbing England of her trade, and consequently of her wealth; and such danger is already at our doors. This danger arises from two causes. First, from foreign labour producing more for less wages, and secondly, from this labour being often directed by more intelligence than ours. It is this latter cause of our deficiency, the lack of the due influence of mind on matter, that these grants for technical education are intended to rectify. It is most earnestly to be hoped that the people of England will avail themselves of the opportunities now, perhaps, for the first time, presented to them, and seek to be guided more and more by intelligence in their work, and not so much as formerly by that dear old "rule-of-thumb." This is the more important, as we do not wish to see our people over-worked. Many of the workers in the most well-to-do Continental nations labour fourteen, fifteen, or sixteen hours a day. This







THE NEW HUNGARIAN HOUSES OF P.  
INTERIOR OF T



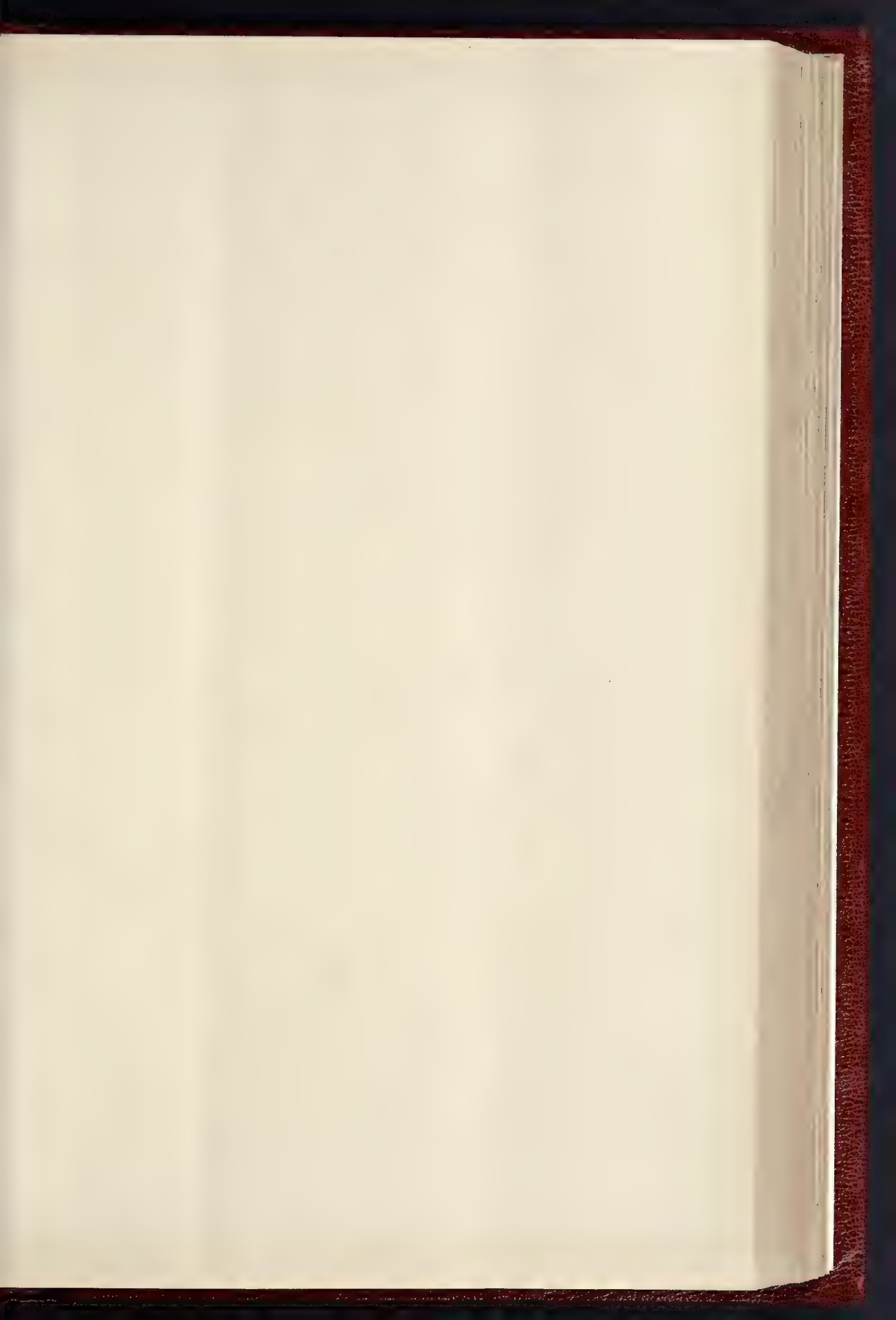


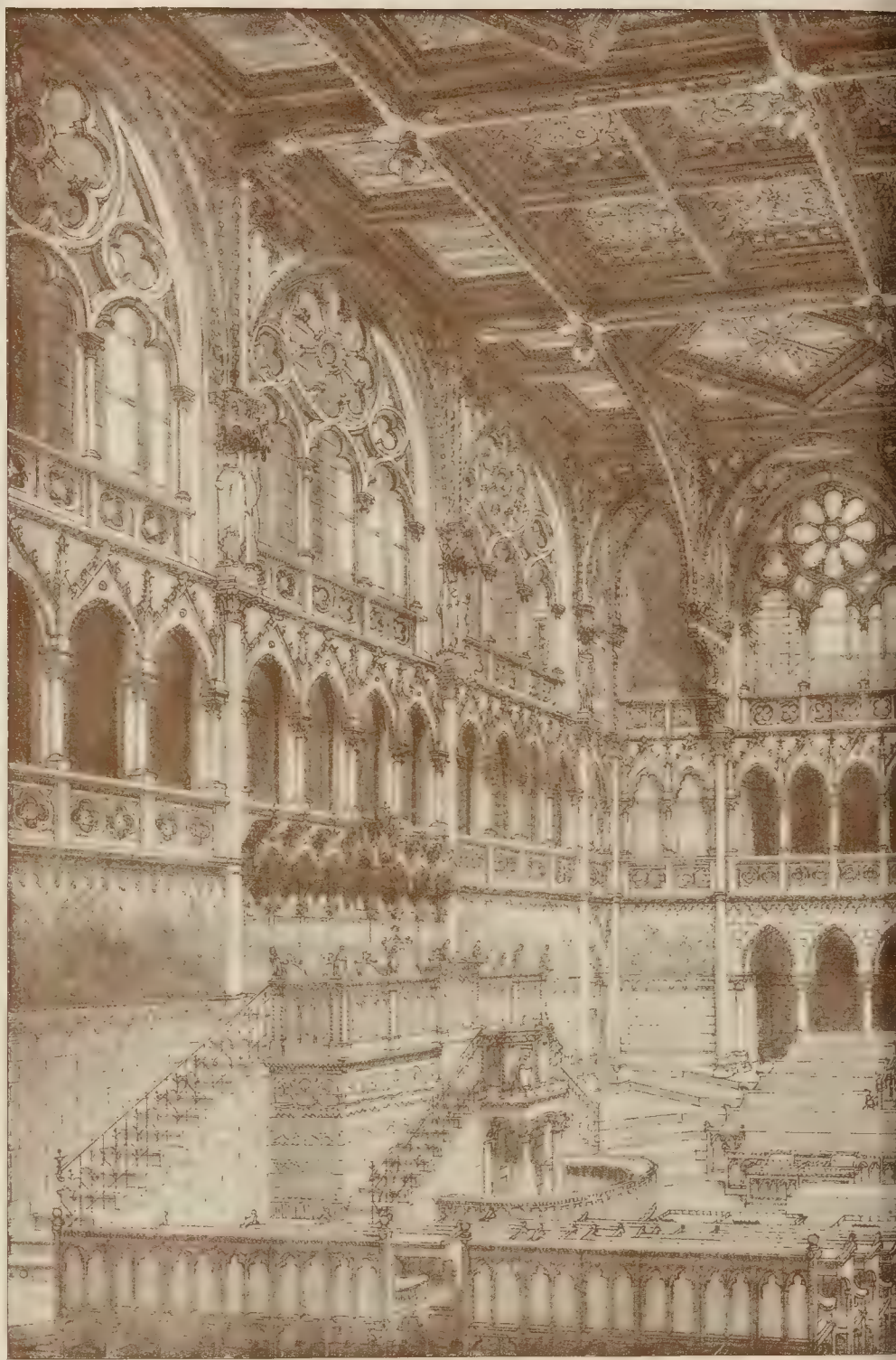
THE PHOTOGRAPH BY H. J. W. HARTMAN, STREET 17, TEL. 121.

BUDA-PEST—HERR E. STEINDL, ARCHITECT  
OF DEPUTIES.









THE NEW HUNGARIAN HOUSES OF PARLIAMENT  
INTERIOR OF THE LOWER CHAMBER





INK PHOTO. N. H. W. A. A. S. EAST HALLING. THREE TENTH CANE. E.

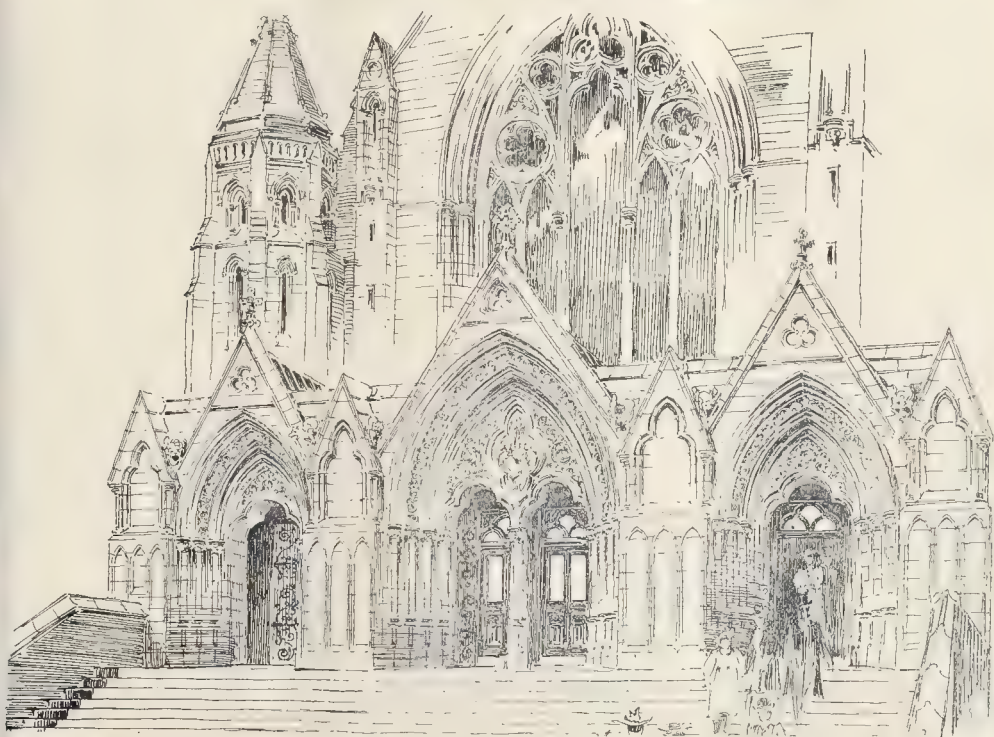
BUDA-PEST.—HERR E. STEINDL, ARCHITECT  
OF LORDS.







*Coats Memorial Church, Paisley: View from North-West.*



*Coats Memorial Church, Paisley: West Porches.*



will not do any longer for us Englishmen. We must have our time for recreation and for improving our minds. And quite right too; only without something worthy of our interest to occupy our leisure, we may perhaps be better without it. Let us then put all our energies, physical and mental, into our work while we are about it, and have a care that our leisure hours are well spent also. And where, may I ask, sir, could they be better spent in the long dark evenings of autumn and winter, at any rate, than in that temple of technical instruction which you have just raised for the benefit and enjoyment of the people of Newbury?

For the evenings of spring and summer there is perhaps a purer joy even than those offered by your excellent institution. I mean in the study and appreciation of nature. To many this may seem a somewhat vain and frivolous pursuit. To mere money-making people it is profitless; even to those whose hearts are set on higher things it may seem so too. But the fact remains that we have been placed in a most beautiful world, and in this immediate neighbourhood is not the least beautiful part of it. Its wonders, its mysteries, invite us all, are open to all. The poorest as well as the most well-to-do of us have offered to them in the beauties of nature an inexhaustible feast, almost intoxicating to the senses, giving joy to the heart, an antidote to the petty worries of existence. Yet how few avail themselves of the good thus provided for them? If we search for the cause it is not far to seek. We have eyes, but they see not; ears, but they hear not. The cause of our blindness, our dulness, our apathy and indifference, is to be found in our ignorance and want of study. We do not train our eyes to observe; and we cannot see what we know and care nothing about. To take a familiar instance or two. Many people would say that in summer all trees are green, whereas they are all grey, inclining to green more or less; with every variety of hue and tone,—their upper surfaces bluish when reflecting the sky; their under surfaces reddish when reflecting sun-lit earth; their young July shoots are yellowish, or, as in some oaks, rose-colour. The unobservant would not notice the way in which various sorts of trees receive the sunshine, or the diffused light of a dull day; the broad masses of it which settle on the elm, the bright points on the oak, the feathery tufts of light which enliven the foliage of the ash. Nor would they notice the peculiarities of tree-growth; some species inclining to a pyramidal form, with central stem and leader; others with forked branches to a more globular shape, or to a flattened head, or to pendulous branches. Nor would they notice how special circumstances modify these characteristics of race, how wind persistently blowing from one quarter will incline the tree's growth to leeward; how the shade of other trees will drive it to strange manoeuvres in its search for light and sunshine. What pursuit is more fascinating to the observant than the study of reflections in almost still water? Wayward they seem to be, and yet all submitting to inexorable law, from the point where they begin, so well defined, from the opposite bank to where they lose themselves in the submerged sunlit pebbles at our feet.

But you will say, what has all this to do with the new School of Technical Instruction we are opening to-day? Why would you send us out into the fields, woods, and commons, when we have just acquired this new source of interest and enjoyment at our very doors? To the point, then, without more to do. I notice that by far the larger number of your students hitherto have been those who attend the drawing-classes. Drawing is, in my opinion, the best key whereby to unlock our appreciation of the beauties of nature, and it is here, under the able direction of your Art Master, that you can be put in possession of this precious "open Sesame." If rightly practised, drawing teaches us to observe with an intelligent eye. It is not merely necessary to acquire dexterity in the use of pencil and brush. We need work with head and heart, as well as with hand; and there is yet another faculty which the art student ought to practice—that of memory. I would commend the habit, after a careful study of any object in the schools or scene out-of-doors, of reproducing it from memory only, and then comparing it with the original study, or, better still, with the subject itself. The knowledge beforehand that he is going to put his memory to so severe a test will act as a powerful incentive to the student to keep his mind, while at his sketch, on the *qui vive*. He will observe the proportions of things, the subtlety of the curves of nature, the harmony and delicacy

of her colouring in a way unknown to those to whom this method is unfamiliar. To the architectural student I know this practice to be of the greatest value, a short cut, if such a thing there be in art, to available knowledge and self-reliance.

So then let us learn to draw from motives apart from the hope of becoming professional artists. From their own standpoint the world is already too full of them, and, possibly from the very prodigality of their output, is more chary than it used to be of becoming possessed of modern pictures. Even painters of the greatest distinction are now by no means sure of disposing of their works, though such works were eagerly sought for and purchased some few years ago; and English art certainly shows no sign of retrogression. I would not therefore by any words of mine encourage the production of pictures as a means of livelihood; but I would do all in my power to advocate the learning to draw, as an accomplishment most useful in itself, as a source of great pleasure to its possessor, and chiefly as a means, and perhaps the most effective means, of approaching the study and appreciation of the beauties of nature. While saying this I would not have us forget that a knowledge of botany, geology, and other branches of natural science are also important means to this end.

Our national education, in which, of course, I include institutions of this kind, should, I think, be made to lead the rising generation to regard as something sacred the beauties of the world in which God has placed us, as one of His best gifts to man. They should be taught to look with aversion on everything which tends to degrade or destroy those beauties—on such things as waste-paper thrown carelessly about in meadow and hedgerow, on the discarded tins, kettles, and other litter, which now too often give an untidy, unworthy character to many an otherwise attractive Berkshire village; and, above all, our children should be taught to view with abhorrence the senseless and selfish work of the bill-sticker in spoiling and rendering sordid the aspect of our towns and the charms of the country. It takes, they say, a good deal to rouse the British Lion; but I confess I am sometimes amazed that he takes so quietly, without an occasional roar and lashing of his tail, the disfigurement of his heritage at the hands of the selfish and often gullible advertiser. Not only are the pleasures and dignity of his existence imperilled thereby, but he has to pay dearer for his wares, or else get them of inferior quality; for does he not see millions of money spent annually in advertising, and is he not aware that all this money comes out of his own pocket (if he have a pocket?), poor old long-suffering British Lion. Now, if he chose, the schoolmaster could cure all this in the course of another generation by exposing such chicanery, and giving our children right views as to their duties and obligations to help keep the world in its beauty for the good and pleasure of all. A healthy anxiety for the enjoyment of others would, I believe, even lead us further. We should be careful that our persons, our houses, our gardens and fields should be as attractive and pleasant as our means would admit of, not to gratify personal vanity, but our own and others' sense of the decorous and beautiful. This generally will be of easy accomplishment. We shall have only to preserve what is beautiful, and prevent its disfigurement.

Again, the same spirit would make us careful not ruthlessly to destroy what remains to us of the good work of our ancestors, especially in the way of architecture. The building art in this country was a traditional art up to comparatively modern times, that is to say the style of a building did not depend upon the whim of its designer. Its style was the style of the day, and though style changed, it changed very slowly and from natural causes. This reality and spontaneity of style gave a charm to old buildings, which modern ones in these eclectic days can never possess; and it behoves us jealously to preserve what has come down to us from the past, not only for our own admiration and profit, but also for the benefit of our children. I hope, therefore, that the town of Newbury will make a strenuous effort to keep intact and in repair its ancient Cloth Hall and Granaries, which are, as I have before remarked, one of the three remaining attestations of its former renown as an important centre of England's commercial and manufacturing activity. Your wealth and your taste may yet give to Newbury many a noble building, but you can never have again another Jacobean Cloth Hall. It is a possession which the town ought to be proud of, and guard against ruin and destruction."

## Correspondence.

To the Editor of THE BUILDER.

### "DESIGN" IN THE FLORIN.

SIR,—The reverse of the florin of '87 bears four shields and four sceptres, two of each being for England and one of each for Ireland and Scotland respectively. One sceptre is tipped with an Irish and another with a Scotch emblem.

Upon the florin of '93 the four shields are reduced in number to three, representing separately the three component parts of the United Kingdom; and the four sceptres to two, one for England, surmounted as before by a globe and cross, the symbol of dominion; the other by a globe, and apparently an eagle, for what, if not for either Ireland or Scotland?

As this latter form of sceptre seems to be an innovation, will some student of numismatics be pleased to describe it more precisely, and state its import exactly?

J. HOUGHTON SPENCER.

### DRAIN VENTILATION.

SIR,—I am still disposed to maintain that fresh air should be admitted at the bottom instead of the top of the inspection chamber wherever such a position is possible, and that that is the best position in cases, commonly occurring in town, where it is impossible to bring the anti-syphonage pipe or other outlet vent into the top of the chamber, and the only outlet is at the bottom of the chamber through to drain running under the house.

In such case the rush of air caused by a discharge through the drain would force the air in the chamber through the most convenient outlet. This would be the inlet vent, if placed at the top of the chamber, and unprotected by a mica flap; but, with the inlet vent placed at the bottom of the chamber, the motion of the air, according to my theory, would be different.

The air, passing through the drain and displacing the air in the chamber, would find a more ready exit in the reverse current at the top of the drain than in the inlet vent, where it would have to displace a column of heavy cold air.

To make the plan effectual the drain must be of sufficient size to allow of a reverse current; a 6-in. pipe is usually large enough.

Considering the very important position sanitation occupies in the science of building, it is surprising that in the science of building, it is such a debatable question, but so it must be until it can be studied and settled experimentally.

Since the Science Committee of the Institute are endeavouring to raise a fund for experimental research into questions relating to building, and the Sanitary Institute have made useful experiments on the flow of water through drains, there may be some hope that this important subject of drains will soon receive the attention it deserves.

ARTHUR BAKER.

SIR,—In the correspondence on this subject few of your correspondents have looked at the first principles of the question, namely: 1st. The object of the disconnecting trap; 2nd. The object of ventilating main sewers. If you can elicit further information on these questions, you will be doing a greatly-required and long-neglected public service.

As to the first point—disconnection; traps are not disconnectors, but merely hindrances to circulation, hence the object of disconnecting chamber with fresh air inlet over trap, so that all noxious gases passing through are purified, and the disease germs killed or so reduced or diffused as to be innocuous, and certainly not likely to penetrate the second trap.

The chamber is thus in reality the only protection the individual householder has from the filth of the whole community, and perhaps from the specific infection of any fever-haunted neighbour. When he is compelled to abandon it and to make the pure and cleanly surroundings of his home the outlet for the emanations from the filth of the slums and alleys laden with the accumulated disease-germs of the whole town, he will no longer need to boast that an Englishman's home is his castle. As to the trap, it certainly loses fall, and offers some little obstruction to the flow, but these are trifling objections compared with the benefits gained.

It may be true that it retains 35 per cent. of solid matter, and yet may be a "well"-constructed trap, but whether this sewage will be offensive before recharged is a question. Fresh sewage is not generally offensive when in water for several hours. Even if it were, the ventilation above should so dilute the effluvia as to render it unobjectionable, and there is little risk of disease infection. It may occasionally also cause stoppage when drains are improperly used, but this is certainly an advantage



in calling attention to the fact. Loaves of bread and sheets of newspaper are not desirable even in main sewers.

If this trap is removed the inner trap is only a hindrance to the circulation of air from the sewer, and owing to the variation of atmospheric pressure between the inside and outside of a house is little use even for that. It would also be liable to syphonage if improperly ventilated and when accidentally unsealed and in cases of defective joints, the house would become the direct ventilator of the public sewer, which, despite the general foulness of our domestic atmosphere, would not tend to improve matters. There is no doubt that the house drain is invariably dirty, but passing filthy sewer-air through it instead of pure air is not likely to improve it but rather to introduce disease germs to a favourable home.

As to the second point, the ventilation of main sewers seems yet to be a point more for the chemist and biologist than the engineer. The main object of ventilation has generally been to preserve the seal of the trap your correspondents propose to abolish, and secondly, to reduce the malignancy of the disease germs and prevent suffocation of persons working in sewers. The latter point can be disregarded, as their protection can always be specially provided for. As to the second, we need to know more of the life history of bacteria—whether they can live in a hermetically sealed sewer without oxygen; whether ventilation reduces the malignancy of diseases arising from sewers and sewage, and if so, why; are the germs reduced in number or in power, or both; how soon these germs will expire in the open-air of an ordinary town, and generally the best protection from them; what are the ill effects of sewer-air other than from germs, and will its dissipation in a large volume of air obviate them; also, to what extent ventilation will aid in stimulating putrefaction, that is, decay having commenced, will not ventilation hasten it? When these questions are answered ventilation may be more seriously discussed, but not until. At present the disconnecting chamber seems an effective barrier against disease germs, so why not retain it?

As to any real system of ventilation as architecturally understood, the task seems impossible; we have not yet learnt how to ventilate houses. The varying air-space, velocity of flow, filthy sides exposed, and vapours given off, and the varying temperature of sewage, the influence of external heat and wind, and the friction with water and pipes, are difficulties awkward to overcome, even if air currents were in any way amenable to discipline, which they are not. It is questionable whether unlimited ventilation would prevent the outlets being a nuisance, and as the main object of the sewers is to get rid of the filth, it is surely a questionable policy to use it to generate gases which are to be forced on the public in homoeopathic or larger doses, as the case may be. Without ventilation, disease germs cannot get into the air, and man-hole grates at intervals of say 200 ft., protected as chemists and authorities on bacteria may determine, seems to be the wisest course to pursue until the subject is better understood.

But, of all systems proposed, that of ventilating-pipes seems most unsatisfactory. Being quick conductors, in a hot sun they are too active, and in the cold they condense the vapour and cause draught. The friction round the numerous curves is a great objection if free ventilation is desired, and the blockage by iron rust is perhaps the most desirable end, in connection with a house they generally discharge near slates and chimneys, where, for reasons already stated, the gases readily find access to places where they are best calculated to do the most harm. With cottage property with already too limited air-space, a fall-pipe per house would mean about forty per acre, whereas with villas, and a superabundance of air, perhaps only four per acre. Our streets of cottages are invariably hideous, and the present ventilating-pipes help to accentuate the fact. When we have one per house wriggling round the front to a ft. above the ridge, the blind will have cause to rejoice, and the insanitary to be happy in filth.

August 21, 1894.

JOHN BRETT.

## THE PROTECTION OF TRADE MARKS IN GERMANY.

SIR,—A new law for the Registration and Protection of Trade Marks has been promulgated in Germany, and comes into force on October 1 next. This law, in its main provisions as to what constitutes a trade mark and is registrable as such, conforms very nearly to the Trade Mark Section of the English Patent Law of 1883. It also embodies provisions analogous to some in the Merchandise Marks Act of 1887, which traders who send goods into Germany would do well to make themselves acquainted with. Any person who knowingly or through gross carelessness applies the name or firm of another party, or a registered trade mark, is liable for damages, and, further, to a heavy fine, or to six months imprisonment. Anyone who wrongfully applies a State coat-of-arms, or coat-of-arms of a district, or of a municipal or corporate body, for the purpose of creating confusion regarding the nature or value of the goods, or any person who offers for sale goods bearing such marks, will

be punishable by fine or imprisonment. Foreign products which wrongfully bear the name and locality of a German firm, or a registered trade mark, on entering Germany as imports, or for transit, are liable to seizure by the Customs House authorities, and confiscation. When an illegal mark on the goods cannot be removed, the goods may be destroyed. Where German goods must bear a certain mark or signification on being imported into a foreign country, or if such goods are not so favourably treated at the Customs House in respect of the trade marks, as the goods of other countries, the Federal Council is empowered to subject goods imported into Germany from such foreign countries to the same restrictions, and in case of violation thereof to seize and confiscate the goods. All trade marks at present registered in Germany must be re-registered under the new law within the next four years—i.e., before the 1st of October, 1898; there is no necessity, however, for any immediate action on the part of the proprietors of such marks, but at the same time no advantage is gained by postponing it.

W. P. THOMPSON & Co., Patent Agents.

## TESTING DRYNESS OF PLASTER.

SIR,—I am in some difficulty as to the safety of occupying a house now in course of erection which I very much wish to inhabit (if I can do so safely) at Michaelmas next. The house is built on pure chalk rock, and there are no cellars. The floors on the ground floor are to be of the best concrete, but are not yet laid. The concrete covered in the sitting-rooms with wood-block flooring. The walls (which are double, with an air-space of  $\frac{1}{4}$  in. between them) were finished, and the roof also, about four weeks ago, and the plastering of the upper floor was completed on the 16th inst. I should here mention that I am not going to paper any of the rooms till at least a year after the house is occupied.

What I hope some of your readers may be able to tell me is—Whether there is any recognised means of accurately testing the degree of dryness of the plaster, say, in four weeks' time from now, and of judging from the result whether the rooms would be safe to sleep in on and from September 29.

ARABATY.

## BUILDING-LINE QUESTION.

SIR,—I intend building a cottage on a plot of ground adjoining my house, which is 6 ft. from the pavement or original building-line. I am desirous of building from the old line, but the Corporation of West Ham say I must set the cottage back to my house. As this is a great hardship I shall be glad to know what action they can take in the matter, the road being about 40 ft. wide, and two-thirds of the property is built on the old line.

D. S. McBEAN.

## TINSLEY PARK BOARD SCHOOL COMPETITION, SHEFFIELD.

THE following correspondence in reference to the recent competition for the Tinsley Park Board School, Sheffield, has been sent to us for publication:—

TO THE CHAIRMAN AND MEMBERS OF THE SHEFFIELD SCHOOL BOARD.  
GENTLEMEN,—The Council of the Sheffield Society of Architects and Surveyors have had their attention drawn by several competitors to the assessor's report on the designs submitted for the school at Tinsley Park-road, and to the award of the first place to the design, "Sangler Rouge."

The service rendered to the School Board by the architects of Sheffield, in submitting fourteen sets of designs for the school, at a cost to the profession of considerably more than the commission to be paid for the completed building, is, it is hoped, a sufficient reason for the Council of the Sheffield Society of Architects and Surveyors venturing to submit their views to the Sheffield School Board.

The award appears to be based upon one of the concluding paragraphs of the assessor's report rather than upon the preceding fuller criticism.

The assessor brackets together as equal "Sangler Rouge" and "Multum in Parvo," the former for his higher qualities of architectural design, the latter for his more perfect fitness of plan, and states that "on a third ground, viz., that of suitability to site, he prefers the former," although from the detail report the latter appears to be the one he prefers.

The assessor's fuller criticism of design, "Sangler Rouge," states that it provides only three infant class-rooms (which is contrary to the conditions of the competition); and, after enumerating points in which the plan does not comply with the requirements of the Education Department, states "but although ranking artistically higher than any other, the defect of plan is serious."

The assessor's fuller criticism of design, "Multum in Parvo," states that "the position of the building on the land is well managed, and, in fact, all the playgrounds will be sunny," that he "is the only one who has met all the difficulties without any waste or surplussage in plan"; and further that "he is also at the top in point of economy."

The conditions of the competition state that the buildings are to fulfil the requirements of the Education Department.

The rules to be observed in planning schools, as issued by that department, enumerate "convenience of plan, suitable lighting, and proper sub-division into classes," as leading essentials, and "the school architect is recommended first to perfect his plan."

The Council of the Sheffield Society of Architects and Surveyors are therefore of opinion that the first place should have been awarded to "Multum in Parvo," and further, that the design "Sangler Rouge" should have been set aside, as not having complied with the conditions as to the number of class-rooms for infants. We are, Gentlemen, yours respectfully,

(Signed) EDWARD M. GIBBS, President.

CHARLES HADFIELD, Vice-President.

Sheffield, July 28, 1894.

School Board Officers, Sheffield.

August 17, 1894.

DEAR SIR,—I am directed to acknowledge the receipt of a letter signed by yourself and Mr. Hadfield on behalf of the Council of the Sheffield Society of Architects and Surveyors, and dated July 28, 1894.

The Board regret to find that an objection has been taken to their decision upon the recent competition, but I am to point out that your Council has evidently laboured under the mistake of supposing that an assessor was appointed, whereas the Board simply asked for advice, and reserved to themselves the full power of determining which, if any, plan should be adopted. They made their selection in perfectly good faith, after very careful consideration, and they cannot alter their decision.

Yours faithfully,

(Signed) JNO. F. MOSS, Clerk.

E. M. GIBBS, Esq.,

15, St. James' Row, Sheffield.

JOHN F. MOSS, Esq., CLERK TO THE SHEFFIELD SCHOOL BOARD.

DEAR SIR,—I have to acknowledge the receipt of your letter of August 17th, 1894.

The Council of the Sheffield Society of Architects and Surveyors request you to assure your Board that they never doubted but that the selection of the designs was made in perfectly good faith.

The Council have, however, to notice that your letter of August 17th does not reply to the main points of contention of the letter of July 28th, and as your letter has been published, the Council have thought it desirable to send copies of the whole correspondence to the professional papers.

Yours truly,

(Signed) EDWARD M. GIBBS.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—VIII.

VARIOUS FORMS OF PUMPS (continued).

THE working barrel is formed of hard grey metal, bored out and made truly cylindrical in the larger pumps, and with a gun-metal or copper liner inserted in the smaller ones. The ends are slightly bell-mouthed, and are made sufficiently long to allow from 3 in. to 12 in. clearance beyond the actual stroke of the pump. The thickness of the metal is greater than that of the rising main, owing to the wear and tear, and so as to allow for re-boring when necessary. In forcing-pumps the top of the barrel is made tight with a stuffing-box or gland packed with metallic material, which can be renewed without stopping the working of the pump.

The clack or waist-piece contains a turned conical seating for the valve. In some cases, in open-topped pumps, a second seating of larger diameter is provided above the one generally in use. The advantage of this arrangement is that it enables a temporary valve to be lowered, in the event of an accident, to act until access can be had to the defective valve. Door-pieces are fixed so as to enable the bucket and clack to be examined or changed. These, of course, are only available when the water is below the level at which they are situated. The diameter of the suction-pipe may be reduced below the level of the clack or valve to from one-half to two-thirds of the area of the working-barrel, except in the case of quick-running pumps, when the diameter should not be less than that of the working-barrel.

The rose, windbore, or strainer at the bottom of the suction-pipe takes various shapes, but care must be taken to make the aggregate area of the apertures not less than from two to two and a-half times the area of the suction-pipe.

The pump-rods are either made of wrought-iron with flanged joints bolted together, or of pitch-



pine connected by means of iron side-plates and bolts running through the rods. Hard-wood guides are affixed to the rods when working in a rising main, and metal rollers guide the rods when working a plunger.

The valves, of which there are at least two in every pump, either fixed or movable, require the most careful attention, as they frequently cause a large portion of the power of the pumping apparatus to be lost. It is essential that they should offer little resistance to the passage of the water in one direction, and close the passage quickly and entirely in the contrary direction, so as to prevent slip. The weight of the valve should be sufficient to close without knocking, and be light enough to be lifted without offering undue resistance to the water. In high lifts the valve is usually calculated at 1 lb. in weight per square inch of area, equal to 2.3 ft. of water; and for low lifts it varies from  $\frac{1}{2}$  lb. to  $\frac{1}{4}$  lb. per square inch of area. The velocity of the water through the valves should not exceed 5 ft. per second. The valves used in pumps belong to one of two classes, the hinged or door, and the spindle valve.

The flap or hinged valve (Fig. 8) consists of a flap or sheet of leather, stiffened and weighted

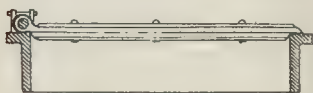


Fig. 8.

with metal plates, working on a hinge, the shell being of wood or metal.

The butterfly valve (Fig. 9) is of frequent application, and derives its name from the wings or flaps, consisting of semi-circular discs hinged

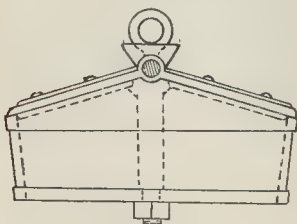


Fig. 9.

to the centre of the shell. The wings, or flaps, are stiffened and weighted with metal plates, similar to the flap, or hinged, valve, and the shell is formed of wood or metal.

The mitre valve (Fig. 10), used mainly in horizontal pumps, consists of a circular metallic

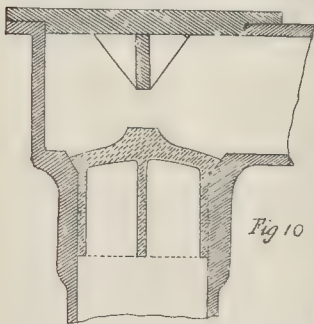


Fig. 10

disc, with conical face, the upper portion having a short spindle to limit its lift, and feathers below to guide the valve on to its seat.

The rubber disc valves (Fig. 11), both single and double, are largely used for lift-pumps, and consist of an iron or gun-metal seat or grid, either forming part of the shell or fitting into a recess in it. The rubber forms the valve, and is prevented

from rising too high by the guard shown in the figure. The apertures in the seat or grid are placed at an angle to produce a circular motion in the water, and thence in the valve. This prevents the valve from falling in the same position

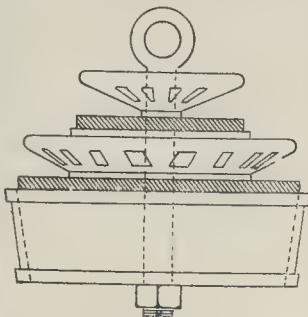


Fig. 11.

and gradually cutting the rubber. Sufficient clearance must be allowed around the spindle for the lift of the valve. Strong dark blue rubber, which is a little heavier than pure rubber, stands better for heavy work.

The double-beat valve (Fig. 12) was first introduced by the well-known firm of Harvey & West, of Hayle, for the Wicksteed Cornish engine at the East London Waterworks. It was designed to overcome the battering and the great wear and

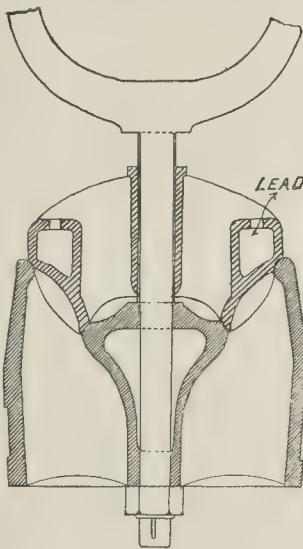


Fig. 12

tear of the flap-valves, and has been used with little modification up to the present time. It consists of a circular ring, on which the lower part of the valve beats, and a similar ring of less diameter on the plate of which the upper part beats, forming "the double beat." The beats are formed of lignum-vitæ or white metal, and frequently of leather. They are fixed to the valve and beat on a gun-metal seat. The valve consists of a double cylinder, one within the other forming one piece, open top and bottom, and working on a spindle. The webs connecting the parts together are placed at a slight angle, to cause the valve to rotate during the influx of water every time it rises and falls, which keeps the beats perfect and tends to prevent grooving. The great advantage of this valve is its small lift, owing to the two openings for discharge, and the vibration caused by the

closing of the valve being diminished in consequence.

The three and four-beat valves only present slight variations, due to the multiple number of beats.

The Riedler valve, which is being largely used on the Continent for quick-speed pumps, is giving great satisfaction. Professor Riedler, the inventor of the valve, has made a series of observations on the action of valves (Indicator-Versuche an Pumpen), and the valve referred to is the result of his investigations, with a view to remedying the defects of valves used in quick-speed pumps. The lift is performed automatically, and the closing of the valve is accomplished by a spring and lever.

The air-vessel is simply a cylindrical vessel of cast- or wrought-iron with a dome top and inlet and outlet connections from the pump at or near the base. The air in the upper part of the vessel is compressed until it balances the pressure of the water being pumped. At those parts of the stroke at which the motion of the pump piston exceeds the average speed, the surplus water further compresses the air to a small extent, and is thereby received into the air-vessel; again, at those parts of the stroke where the speed of the piston is below the average, the water thus stored up in the air-vessel is forced out by the expansion of the air, and supplies the deficiency. The air-vessel equalises the strain on the pumps and pipes through which the water flows, and renders the delivery nearly constant, and is to the flow of water what the fly-wheel is to an engine. The only trouble in practice is that of keeping the air-vessel charged with air, as compressed air in contact with water is more or less rapidly absorbed. Provision should be made either by having a small pump for the purpose of pumping air into the air-vessel, or a small cock should be fixed on the suction-pipe to allow air to be pumped with the water.

The quantity of water contained in a pipe is determined by the formula  $x = .00283 d^2 l$  in which  $x$  = quantity in gallons,  $d$  = diameter of pipe in inches, and  $l$  = length of pipe in inches; being based on the fact that the area of a circle in square inches is  $.7854 d^2$ , and a gallon contains 277 cubic inches, therefore  $.7854 d^2 l = .00283 d^2 l$ ; and  $x \times 10 =$  weight in lbs., the weight of a gallon of water being 10 lbs.

To find the pressure of water in a pipe. The pressure in lbs. per square inch is determined by the formula  $x = .433 h$ , in which  $x$  = the pressure in lbs. per square inch,  $h$  = the head or height of water in feet; being based on the fact that a cubic foot of water weighs 62.4 lbs. and a square foot contains 144 square inches, therefore  $.624 \div 144 = .433$  lbs.

The quantity of water delivered at each stroke of a pump is obtained by means of the formula given for the contents of a pipe. If  $d$  = the diameter of the working barrel or plunger in inches,  $l$  = the length of stroke in inches.

The quantity delivered per minute is determined by the number of strokes per minute multiplied by  $.00283 d^2 l$ .

These calculations make no allowance for slip, which varies from five to fifteen per cent., according to the condition of the pumps. The amount of slip is determined by accurately measuring the quantity of water delivered by the pumps into a cistern or tank of known capacity, or over a weir, and comparing the quantity with the calculated delivery, according to the dimensions of the pump. The method of gauging over weirs will be described in a future paper.

#### OBITUARY.

MR. WYATT PAPWORTH.—We regret to record the death, which occurred last Sunday morning, of Mr. Wyatt Papworth. According to the *Journal* of the Institute of Architects, Mr. Papworth was present, a boy of twelve years, at the first general meeting of the Institute, held July 2, 1834, when his father, with eleven others, subscribed their names to the first address, and he attended the anniversary dinner held on the 2nd ult. at the Whitehall Rooms. He was born January 23, 1822, and was the second son of John B. Papworth, architect to the King of Württemberg. Educated at University College School, he received his early professional training in the office of his father. Serving for a time under the Commissioners of Sewers for Westminster, he afterwards entered the office of Sir John Rennie, and subsequently accepted the appointment of assistant, and later of surveyor, to the Alliance Fire Insurance Company, the branch office of which at Ipswich was erected from his designs. This appointment he held for over forty years, retiring in



1888. He rearranged the large corner building in King-street, St. James's, for the Junior Army and Navy Club, and was successful in a number of competitions, though from one cause or another only three or four of his designs were carried into execution. He was elected Fellow of the Institute in 1860, and served for many years on the Council, of which he was a member at the time of his death. He had been Master of the Worshipful Company of Clothworkers, took a leading part in the promotion of technical education. He was the editor of the last three editions of Gwilt's "Encyclopædia," the chief contributor to the "Dictionary of Architecture," which he edited from its beginning, and which he lived to complete. Among his other literary work may be mentioned the "Life and Works of J. B. Papworth" (his father), privately printed in 1879, and his "Renaissance and Italian Styles of Architecture in Great Britain," published in 1883. He was a frequent contributor to the *Journal of the Institute*, as well as to *Notes and Queries*. The essay, "Peculiar Characteristics of the Palladian School of Architecture," won him the silver medal of the Institute in 1849. Mr. Papworth, at the time of his death, was Curator of Sir John Soane's Museum.

HERK FRANK SCHMITZ.—We regret to announce the death of Herr Franz Schmitz, of Strassburg. He succeeded August Hartel in the supervision of the Strassburg Cathedral, and is considered to have most ably filled this difficult post during the present important period of its renovation. Herr Schmitz died at the age of sixty-two. He had only held office at Strassburg since 1890. Before that he was for six years architect to the Ecclesiastical Commissioners at Cologne, where he had been trained as a master-mason on the Cathedral works. He was a pupil of von Schmidt, of Vienna. Soon after 1864 Herr Schmitz practised privately, building a number of churches in the Rhine district and one at Copenhagen. Of the many buildings which were restored under his supervision we may mention the Bonn "Minster." Of his literary works, "The Cologne Cathedral: its Construction and its Decoration," is the best known.

#### GENERAL BUILDING NEWS.

CHAPEL, WOLVERHAMPTON ORPHAN ASYLUM.—The foundation-stone of a new chapel at the Wolverhampton Orphan Asylum was laid recently. The building is Tudor in style, and its erection will be carried out under the superintendence of Messrs. Smith, Brodric, & Lowther, architects, Hull. The present building is a cruciform in plan, consisting of nave, choir, and sanctuary, and north and south transepts, with organ-chamber and vestry. The dimensions are—height 45 ft., length 100 ft., width across the transepts 50 ft., across nave and choir 24 ft. The children's entrance is on the north side, and visitors will be admitted by a porch at the north-west angle, while a western doorway is to be provided for exit for processions on festive occasions. Externally the new chapel will be faced with local bricks with diaper pattern worked in Hollington stone dressings. The windows are to be filled in with sheet glass and leaded lights, and the roof will be constructed of red deal and slated. A feature in the western elevation towards the Penn-road will be an oak turret, in which will be provided for staircases access to the roof, and room for a bell if required. Internally the building is arranged to accommodate 400 persons. It is proposed to finish the walls in stucco relieved with stone dressings and bandings, the upper part of the chancel walls being faced entirely with stone, and the lower part stuccoed so as to admit of future decoration with frescoes or mosaic when desired. The aisles will be laid with encaustic tiles, the remainder of the floor being of wood blocks. The choir, consisting of thirty stalls, will be of oak, the remainder of the sittings being in red deal. The building of the chapel has been entrusted to Messrs. H. Wilcock & Co., Darlington-street. The architect is Mr. F. T. Beck, Darlington.

NEW CATHOLIC CHURCH, BRIDLINGTON.—This building, which was opened on Thursday by Cardinal Vaughan, has been designed by and carried out under the superintendence of Messrs. Smith, Brodric, & Lowther, architects, Hull. The church is in an early style of Gothic architecture, and consists of a nave, 54 ft. long by 17 ft. wide, with north and south aisles 8 ft. wide, and at the end of each aisle is a side chapel; one is dedicated to the Blessed Virgin, and the other to the Sacred Heart. Each chapel has above the altar, and at the side, traceried stone windows, which have been filled in with stained glass; the roofs are groined with the best selected pitch-pine boards, and moulded ribs, which terminate with a carved boss. The sanctuary is 20 ft. in length and 17 ft. in width, and has an octagonal apse, with traceried stone windows, and is divided from the nave by a lofty arch, resting on clustered shafts of polished Derbyshire marble, and capitals richly carved in Early English foliage and designs, and bases. The arches separating the sanctuary from the side chapels are filled in with traceried oak screens. The nave is divided on either side from the aisles by arcades of four bays, with moulded arches on octagonal shafts of Hopton Wood polished stone, and

moulded caps and bases. The nave has a clearstory of lancet-headed windows and the aisles are also lighted by similar shaped windows. The choir gallery is at the west end above the main entrance, with an organ-chamber at one side. The west front of the church is the most prominent feature; it is built of the best red stock bricks and stone dressings, and the massive angle buttresses terminate in pinnacles of stone. A long two-light traceried window and a single light one on either side fill the gables above the western entrance. Carved stone niches are fixed between the centre and side windows for statues of the patron saints. The gable is coped with moulded stone, and the apex is a finely-worked cross. There is a large working and private sacristy, and in a recess in the aisle wall is the Confessional. A large heating chamber is formed below the sacristy for a high-pressure heating apparatus. The accommodation provides for about 300 adults. The contract was let to Mr. John Rennard, at 1,870l. Mr. Bayart, of Bruges, has executed the oak stalls and screens, Mr. Ebner, the whole of the marble terrazzo floors. Messrs. King & Co. supplied the heating apparatus, and Messrs. Milne & Son, of Leeds, the basket-shaped glass pendants which hang from the centre of the nave arches. Mr. Frith, of Hull, has executed the stone carving, and the stone altar in the Lady Chapel is also his work.

YORKSHIRE PENNY BANK, LEEDS.—On the 17th inst. the new Yorkshire Penny Bank, Leeds, was opened. The new building has been designed by Mr. G. B. Bulmer (Messrs. Perkins & Bulmer). It is a frontage to Tarncliffe-street of 115 ft., and the main front to Infirmary-street extends over 103 ft., while at the angle a tower rises to a height of 120 ft. The bank proper, which is located on the ground floor, has two entrances from Infirmary-street, and is a room 90 ft. by 40 ft. A series of arches with carved stone caps and bases run around the room, those to the front and rear enclosing the windows, while the corresponding spaces on the side walls are filled in with marble, and the spandrels between the arches with marble mosaic. The floor space in front of the public counter is laid with marble mosaic, the floor behind being laid with wood blocks, and the ceiling is panelled with fibrous plaster. The desks and counters are of oak, and the same material has been employed in paneling the room. At the end of the room is a hydraulic lift which carries the ledgers, &c., down to a vault below. The inspection screens, between the bank and the adjoining rooms of the manager and the assistant-manager, are filled with coloured glass, and the room is lighted at either side by five plate-glass windows. Leading out of the manager's room is a strong-room, constructed of steel plates and steel rails in cement. The manager's and sub-manager's rooms are separated by a corridor leading from the bank to the board-room. The sub-manager's room is on the right-hand side of the corridor, and beyond it is the inspectors' room; while on the other side of the passage is a hydraulic lift, communicating with all floors of the building, and intended for the use of the porter. Beyond the lift is what is known as the directors' entrance, which leads from Tarncliffe-street, and the directors' cloak-room, with floor, walls, and ceiling of glazed tiles. The board-room is 33 ft. by 24 ft. The walls are panelled with a dado of English brown oak, the space above being lined with Sienna marble, with deep red bands. The floor is laid with parquetry. The premises are lighted throughout with electricity. To the rear of the bank room, and at the right-hand of the building, is a wing, with a separate entrance from Infirmary-street, containing accommodation for the clerks. On the ground floor there is a lavatory, with tiled walls and ceiling, and mosaic floor. The bank is warmed on the hot-air principle. The whole of the ground floor is occupied by the bank premises. The two upper floors are laid out in suites of offices. These are approached by a stone staircase, placed in the tower, and also by a hydraulic passenger lift, which has been erected by Mr. Robert Middleton, of Sheepscar Foundry. There are on each of the upper floors five suites of offices, with from two to five rooms each. On emerging from the staircase, on either floor the visitor passes through a vestibule, from which corridors, running at right-angles along the two main lines of the building, give access to the offices. The passages are laid with mosaic, and the walls and ceilings are tiled. All the offices are in every case illuminated by electricity, and lighted by windows. The rooms are laid with wooden blocks, and are fitted with majolica fire-places. The building, which throughout is constructed as far as possible of fireproof material, represents a total outlay of about 50,000l., and has occupied about three years in erection. Messrs. Nicholson & Sons, of Leeds, are the general contractors; Messrs. Illingworth & Ingham have supplied the wood block and parquetry floors; Messrs. Marsh, Jones, & Cribb the oak fittings of the bank and board-rooms; and Mr. Wragge, of Manchester, has carried out the wrought-iron ornamental work to the architect's designs. The marble and mosaic work has been provided by Messrs. Pattison & Sons, of Manchester; the coloured glass by Messrs. Powell Bros., of Leeds; and Messrs. Dixon & Son, of Leeds, have supplied the wiring for the electric lighting. Mr. Gilbert Seal, of London, has executed

the fibrous plaster ceilings; and the system of hot-water heating apparatus has been fitted by Messrs. Ashwell & Nesbit, Leicester.

CONSERVATIVE CLUB, PONTYPOL.—The foundation-stone of the new club in Osborne-road, Pontypool, has just been laid by Mrs. J. C. Hanbury. The architect is Mr. D. J. Lougher, Pontypool, and Messrs. Monk & Co., of Newport and Crumlin, are the contractors.

NEW HOTEL, LOSSIEMOUTH.—Contracts have been arranged for the erection of a hotel at Wothfield, Lossiemouth, Elginshire. The building will be built in a free Classic style, with large public rooms. The bedroom accommodation, in the first instance, will be for thirty guests, and, when finished, will accommodate forty-five guests. The site overlooks the golfing links, and in the grounds will be a large bowling-green and tennis-courts for the recreation of visitors. Mr. R. B. Pratt, of Elgin, is the architect.

TECHNICAL SCHOOLS, OXFORD.—The formal opening of the new block of buildings erected in Church-street, St. Ebbe's, by the Corporation of Oxford, for the purpose of a school for technical instruction, took place on the 14th inst. The building has been erected at a cost, including fittings, of about 4,500l. The front elevation has been designed by the architect to consist partly of the old school house and partly of new work, the latter being of red Headington bricks, with dressings of box-ground freestone, and gabled. The main gateway leads through a wide-arched corridor into a yard. From this corridor there are entrances on the right hand and on the left to the various classrooms intended for the work of the science, art, commercial, and domestic students, and also to the caretaker's rooms. This block of buildings occupies the whole of the south and east sides of the school. On the north side of the yard, and facing the entrance through the corridor, are the workshops for the wood and metal departments. The department for science students consists of three rooms, a lecture room, and chemical and physical laboratory, and a master's room. The site of these rooms was formerly that of the Bluecoat School. The department for art students consists of a room, 52 ft. by 22 ft.; also two class-rooms, together with a master's room. The art rooms are on the first floor of the new portion of the buildings; on the ground floor of the same is a corridor opening into three large class-rooms, which may be used as required, either by science, art, domestic, or commercial students. The buildings are heated by the hot-water system, the boiler and storage rooms being in the basement below. The architect was Mr. H. W. Moore; the builder, Mr. Charles Curtis; and the clerk of the works, Mr. R. England.

BOARD SCHOOLS, GATESHEAD.—New Board Schools have just been completed at Gateshead. They are placed on a site at the junction of old Durham-road with Inskip-terrace. There is accommodation for 1,080 children in three departments—viz., boys, girls, and infants, the latter being a one-story building in a separate block. Advantage has been taken of the fall in the site by providing a manual instruction room and a cookery class room in the basement story of the senior school, while from both the boys' and girls' departments. A central corridor gives access. A hall the class-rooms. The school-rooms are divided by means of patent movable partitions; accommodation in the way of cloak-rooms, lavatories, store-rooms, &c., is provided. An emergency staircase (with extra exits) is provided at the east end of the main school. The playgrounds, with play-sheds, offices, &c., are separate in each department. The materials are red local bricks, with stone dressings for exterior walls. A caretaker's house, consisting of a sitting-room, kitchen, scullery, and three bed-rooms, &c., is situated at the angle of old Durham-road and Inskip-terrace, and commands all the entrances. The heating throughout is by means of hot water; at the same time each class-room is provided with a fireplace. The contractor is Mr. Thos. Hunter, of Washington, and the sub-contractors are:—Slatting, C. Nicholson, Newcastle; plumbing, Messrs. Threlgild & Wallace, Newcastle; plastering, W. R. Dodds, Jarrow; painting and glazing, Thos. Metcalf, Darlington. The heating is by Messrs. Henry Walker & Sons, Newcastle. The contractor's price for the whole of the work is 8,227l. The architect is Mr. Stephen P. Per, of Newcastle, whose plans were selected in competition. Mr. Edington has acted as clerk of works.

PORCH, CHURCH OF ST. PETER, GREATWORTH, NORTHANTS.—A south porch, of thirteenth-century design, has been added to the parish Church of St. Peter, Greatworth, Northants. The builder was Mr. Watts, of Helmdon, and the architect, Mr. J. Timms, of Banbury.

WELSH CALVINISTIC METHODIST CHAPEL, LLANGEFEL, ANGLESEY.—Plans prepared by Mr. R. G. Thomas, of Menai Bridge, have been selected for a Welsh Calvinistic Methodist Chapel, at Llangefel, Anglesey. The cost of building will be about 4,000l. The style adopted is Italian, with an open portico of Corinthian columns.

RESTORATION OF FOLKTON CHURCH, SCARBOROUGH.—The Parish Church of Folkton, near Scarborough, is now being partially restored. The works which are at present being carried out are the



repairs of the masonry of the inside of the church, and also of the walls. The floor of the church is being lowered to its original level, the floor of the sacarium being tiled. The nave of the church will be seated with open benches, and stalls are being placed in the chancel, and new altar-rails and standards, and there is to be a new pulpit. The wood windows on the south side have been replaced with stone ones of fifteenth-century character, and a new door is also to be placed on this side of the church. The whole of the works are under the superintendence of Messrs. Smith, Brodick, & Lowther, architects, of Hull; and the contract is being carried out by Mr. R. Kilvington, of Nafferton, and Mr. Rudl, of Driffield.

#### SANITARY AND ENGINEERING NEWS.

**PROPOSED IMPROVEMENTS AT THE HARBOUR, ABERDEEN.**—Mr. Henry H. Wake, C.E., Harbour Engineer, Sunderland, who was consulted on the matter, has recommended to the Aberdeen Harbour Board that a new entrance to the Upper Dock be formed about 70 ft. to the south of the present waterway, and that the existing narrow bridge there from one side of the docks to the other be replaced by a steel single-swing cantilever bridge with bowstring girders, capable of accommodating two lines of railway, besides foot and carriage traffic. He also advises them to widen Regent Quay by about 50 ft. on an average alongside the Victoria Dock for a length of 700 ft. eastwards from the new bridge, and to erect two new goods-sheds, 45 ft. wide, with double line of rails between the sheds and the quay face. These works (including hydraulic machinery, abutments, north approach to bridge, &c.) will cost fully 30,000l. Mr. Wake also recommends the widening of Trinity Quay and the portion of Regent Quay along the north side of the Upper Dock, and the construction of other two goods-sheds, there an additional cost of 16,000l.; and the Works Committee of the Harbour Commissioners have recommended that for the purpose of carrying out the improvements contemplated, further borrowing powers, to the extent of 50,000l., should be applied for in the private Bill, as to rates, &c., to be promoted by them in the ensuing session of Parliament. The resident Harbour Engineer, Mr. W. Smith, M.Inst.C.E., has also presented a report to the Commissioners as to the disposal of dredgings and the increase of dock accommodation. He states that in widening the navigation channel and deepening it to 25 ft. at high-water of spring tides, besides rock excavation, 200,000 cubic yards of soil and silt, to a great extent stiff red clay, will have to be dredged within three years. He points out that the fishing industry, besides occupying a large portion of the tidal harbour, will monopolise the Albert Basin, and that there is no room for much further expansion of the commercial shipping trade in the Victoria and Upper Docks. Even widening of quays and erection of sheds. He therefore proposes that the Commissioners should apply for Parliamentary powers to acquire the foreshore between the North Pier and the Beach Battery, as well as the ground at present occupied by the ropeworks and timber-yards at Footdee, and a portion of the Esplanade at the sea beach, which was made up by the Commissioners. The total area of ground would be 70 acres, and on this site, when required, might be formed a large wet dock with quays, to be entered from the tidal harbour by a lock at Poca Jetty. Mr. Smith suggests that the soil and rock to be dredged as above noted should be utilised in forming a watertight embankment, about 100 ft. wide, protected by a cemented stone-pitched slope and concrete parapet along its sea face, and extending from the Old Round Head of the North Pier to the Beach Battery, a distance of 1,100 yards. This would reclaim from the sea 30 acres (included in the above 70), a portion of which would afterwards be filled up with silt from the harbour by means of a sand-pump placed on one of the large boppers. The expense of the dock and quays is not stated; but the cost of the embankment, slope, and parapet is estimated at 15,000l., exclusive of the value of the foreshore rights and of the other property required. It has been remitted to the Works Committee to report more fully next month on all the above subjects.

**SEWAGE SCHEME, COVENTRY.**—The General Works Committee of the Coventry Corporation having agreed upon the following report, it was submitted to the City Council at their meeting on the 14th inst. and adopted:—"Your committee have received from Mr. Mansergh a report on the disposal of the sewage of the city. The report, together with the whole question of sewage disposal, your committee referred to a sub-committee. . . . It appeared to them, as it does to your committee, that the Baginton scheme recommended by Mr. Mansergh labours under two disadvantages, (1) the difficulties to be apprehended in dealing with the proprietors of the land to be acquired and the adjoining residences, (2) the restricted area of land available, especially having regard to the probability of future extension. The sub-committee therefore requested Mr. Mansergh to consider the possibility of taking the effluent from the present works to a filtration area at Ryton Bridge instead of

at Baginton. Mr. Mansergh has made a rough estimate of the cost of such a scheme carried out on the same lines as the Baginton scheme mentioned in his report, viz., enlarging the present tanks and treating all the sewage and rainfall there up to a maximum volume of 19,000,000 gallons per day, carrying half that volume to the new filtration area, and dealing with any excess above half at the present filter area at Whitley. The estimate is 56,000l. The filtration area would consist of about 120 acres of land immediately below Ryton Bridge in the Avon Valley. . . . Your committee have adopted the recommendation of the sub-committee that Mr. Mansergh be instructed to prepare detailed plans and estimates for a scheme based on the doubling of the present tank capacity, and the acquisition of not less than 120 acres of land immediately below Ryton Bridge in the Avon Valley for the treatment of the effluent water, in order that application may be made in the next session of Parliament for the necessary powers for its execution.

**SANITATION IN CORNWALL.**—In his report for July, as Chairman of the Sanitary Committee of the Cornwall County Council, Mr. Silvanus Trevelyan says:—"It is satisfactory to find that a tender has been accepted for providing a water supply for Lostwithiel, that a loan has been sanctioned for a water supply to St. Austell, and also the long-looked-for sanction to the loan for furnishing the water supply for the Borough of Launceston. The carrying of this project to a successful issue, will mark one of the most important epochs in the history of the ancient capital of the county, and upon which both its Mayor and Corporation may be heartily congratulated. At Newquay the water supply to the low levels of the town is now reported as being adequate. Philack Local Board appears to be still oblivious of the fact that one of the prime necessities of life is an adequate supply of pure water. The Medical Officer has reported that one of its public wells is worse contaminated than ever, and still the recommendation of the Local Government Board to the Local Board to call in an engineer is not attended to. Nothing has been done to improve the sanitary condition of Portleven. Scarlet fever is again making its appearance there. Complaints continue to reach this committee of insanitary conditions at Dobwalls, especially in respect of an offensive slaughter-house, and also of very offensive tanneries at Grampond. . . . Scarlet-fever cases have receded from 299 in an epidemic of July, but there has been increased fatality, and the disease is reported to be of a very malignant type at Buller's Hill, Redruth. There is still the usual complaint of want of isolation, and of the means of isolation. In only two districts in the county is the subject of isolation hospital accommodation apparently receiving serious attention.

**SEWAGE DISPOSAL AND ELECTRIC LIGHTING, MONMOUTH.**—At a recent special meeting of the Monmouth Town Council, the final report of Messrs. Bramwell & Harris, Westminster, on the combined schemes of sewage disposal and the electric lighting of the borough, was adopted. The cost is estimated to be about 17,600l.

#### FOREIGN AND COLONIAL.

**FRANCE.**—A great many architects have sent in their names as intending competitors for the 1900 Exhibition building, but unfortunately the list, so far, does not include any name well known in the architectural world. . . . The Chamber of Deputies has voted 45,000 francs for the installation at the Louvre of a splendid collection of Oriental ceramic work, including more than 3,000 pieces, and which was offered to the State by a learned collector, M. Granddier, who devoted more than twenty years to the collection of curious and rare examples of Oriental china. The collection is valued at 1,600,000 francs. . . . A statue of the late President is to be erected at Molay, the cradle of the Carnot family. A monument to M. Carnot is also to be erected at Nice, on the Place Cassini. . . . At Roubaix there has been a public competition for a monument to the celebrated "chansonnier," Gustave Nadaud, which has been gained by M. Cordonnier, the sculptor. It will comprise a stone column surmounted by a bronze bust of Nadaud, along with two statues symbolising "Art" and "Liberty," and two bas-reliefs illustrating the principal works of the poet. The architectural portion has been completed by M. Lefebvre, architect, of Roubaix. . . . The church of Notre Dame at St. Dié (Vosges), one of the most ancient and interesting archaeological monuments in the east of France, is threatened with a "complete restoration." It dates from the eleventh century, and is one of the best specimens of the Romanesque architecture of the country. . . . A bronze bust has been erected at Orange to the architect, Caristie, author of the plan of the theatre and the scheme for its restoration. . . . A bust of Cervantes has been put up in a grotto near Algiers, as a memorial of his captivity in that town. . . . M. Dalou, the eminent sculptor, has just completed the model of the monument to the late M. Alphand, which is to be placed in the square of the tower of St. Jacques la Boucherie, adjoining the Boulevard Sebastopol. The monument consists of a statue of Alphand, 3 metres high, in the centre of a semicircle of 15 metres diameter. It will be surrounded with four figures representing Painting, Sculpture,

Architecture, and Engineering. . . . The restoration is just completed of the Hôtel de Ville of Hesdin (Pas de Calais) the façade of which is decorated with the sculptured arms of Charles V. and those of the Maison de France. The restoration has been carried out under the direction of M. Mouton, architect, and has been sanctioned by the Government to study and report on the monuments of the Pharaonic age in the Valley of the Nile. . . . The Paris, Lyons, and Mediterranean Railway Company is constructing a new terminus at Marseilles, which will be the finest station on its system. It was commenced eighteen months ago. The estimated cost is more than three million francs. . . . M. Léon Cognat, the sculptor, died at Paris at the age of fifty-nine. He obtained the Prix de Rome in 1859. He was a former pupil of Diebolt and Duret, and has left some remarkable works; among others "La Force et la Justice," which adorns the front of the Cour de Cassation; "Le Patriote," in the Salle des États of the Louvre, and the statues in the Salon des Caryatides at the Hôtel de Ville of Paris. He received medals in the Salons of 1863, 1865, and 1867; and the Legion of Honour in 1874.

**GERMANY.**—The competition for the design of the Bismarck Monument for Berlin has now been opened. The monument is to be in the form of a statue showing the ex-Chancellor in his "Kaiserarm" uniform, and will have a prominent position in front of the new Houses of Parliament on the Koenigsplatz. While the material of the statue is to be bronze, the pedestal can be of any material the artist may select. 4,000l. are to be given in premiums, the ten first having a value of 250l. each, the ten second prizes 100l. each, and the ten third 50l. . . . The number of interesting papers and also some excursions, Strassburg itself has many interesting sights for an architect, whilst the battle-fields of the Franco-German war will be an attraction for every patriot. . . . The Prussian Board of Works Offices have been extended, the new wing costing the Government 25,000l. for the builders' work alone. The wing has a front to the Leopoldstrasse, which has been most elaborately treated in a freestone of unusually good colour. . . . A new bridge is to cross the Rhine at Bonn. It will cost about 150,000l., and a competition has now been opened for the design. The premiums are 400l., 300l., 200l., and 150l. respectively, and the work will be put before a committee of five assessors.

The Emperor has purchased a bust of himself in marble, by the late Professor Hoffmeister, now being exhibited at the Berlin Salon. . . . His Majesty has presented the German Archaeological Institute at Rome with the means necessary for the publication of a comprehensive illustrated work on the column of Marcus Aurelius, which is covered by relief representations of battles with the ancient German tribes. The editors will be Professor Petersen, head of the German Archaeological Institute at Rome, and Professor von Domaszewski, of Heidelberg. . . . The entrance hall of the new Imperial Assurance offices in the Kaiserin Augusta Strasse at Berlin is now complete. . . . Two large statues representing ironworking and building industries, have been placed on the stairway. . . . The Arts and Crafts Committee of the municipality has recommended a grant of 750l. towards purchases of exhibits at the proposed Arts and Crafts Exhibition in 1896. . . . The Committee for the Schul-Deutsches monument has again met with a disappointment; this time the Hausvogteiplatz has been denied them; some time ago, it will be remembered, their application for a site on the Alexanderplatz was refused. . . . The Imperial Canal Commission at Munster is investigating the feasibility of a connection between the Dortmund-Ems canal and the river Ruhr. . . . The new operative theatre in the Surgical Schools at Heidelberg, built from designs by Herr Koch, has recently been opened. The theatre is decorated with busts of Chelius, Simon, and Weber, Professor Czerny's three predecessors. . . . At the recent meeting of the "Kriegerbund," of Hanover, an appeal was made to the constituent societies for the remaining 15,000l. necessary for the Kyffhauser Emperor William Monument. . . . Wittenberg is to have a statue in bronze of the late Emperor Frederick by Herr Hans Arnold, of Berlin. . . . A Bismarck memorial fountain, from the designs of Professor Hildebrandt, of Hanover, has been unveiled at Jena. . . . At a recent meeting of the Carlsruhe Antiquarian Society, Dr. Ernst Wagner lectured on the excavations carried out under his direction amongst the Roman remains near Wössingen, in Baden. The discoveries included a Roman cellar, containing vases and implements in iron and bronze, and a Roman country villa, of which parts of the walls are preserved. The latter are painted, and the frescoes, by the excellence of their execution, take a high rank amongst those hitherto discovered in South Germany. The absence of any further finds renders it likely that the settlement was abandoned, probably, to judge from a coin discovered, dating



from the reign of Septimius Severus, in the commencement of the third century.—Discoveries of Roman architectural remains have also been made at Blankenheim, in the Eifel mountains, where excavations were undertaken under the direction of the archaeologist Koenen.—An ancient tomb, of a date of the fourth century, dating from the Stone Age, has been uncovered at Eisenlund, near Apenrade, on the Baltic coast, and restored by the Schleswig-Holstein Society for the Diffusion of Scientific Knowledge.

**AUSTRIA.**—The Budapest Congress promises us a most formidable list of papers, about 700 already being on the programme. The number of official representatives is also unusually great, some twenty-six Governments having sent together nearly one hundred *gavants*. Over ninety local authorities will send delegates, and forty universities are sending members. As before said, there is much at Budapest to interest the architect and engineer, quite independent of the "Congress" lectures, and the opportunity is a good one to see something of Hungary.

**BRICKS AND TILES IN INDIA.**—According to a recent report of the United States Consul at Bombay upon the manufactures of Western India, the rule bricks are hand-moulded throughout India, a few factories having the appliances for making bricks by machinery. The tile most in use is of native design and manufacture. A tube of clay is spun by hand on a very simple wheel made of wood, and balanced and loaded with clay. It turns on a peg like a top, and having been set in rapid rotation, it revolves long enough for the operation. The tube, which is tapering in form and being by  $\frac{1}{4}$  in. wide, is split by a piece of string into halves, which, when dried and burned, become the country tiles of India. One layer with edges up and one layer with edges down is what is termed a single tiling, and twice the quantity is double tiling. No fastenings are used, there being only one support at the eaves of the roof to prevent them from slipping off. They are repaired once a year before the rainy season. In large towns the European pattern of tile is coming into vogue. The greater number of European tile factories in India are in Malabar and South Canara, where water-carriage along the coast affords a cheap means of transportation. The factories are closed during the rainy season. Tiles have been made in Bombay with clay from South Canara, the clay costing less for transportation than tiles, and there being no loss by damage. Coal was also cheaper at the port of arrival, and it was possible to keep the work going all the year round, owing to the smaller rainfall at Bombay, but the work was undertaken by inexperienced people, and did not succeed.

### MISCELLANEOUS.

**FORTHCOMING ART EXHIBITION AT ABERDEEN.**—The Aberdeen Artists' Society have made arrangements to hold their seventh annual exhibition in the Art Gallery in the beginning of October. All works for the exhibition have to be delivered not later than September 17. The Society has 500 subscribers, and it is stated that the financial success of the exhibition is very satisfactory. An Art Union has also been formed in connexion with the Society.

**LEICESTERSHIRE TRADES AND INDUSTRIAL EXHIBITION.**—Under the auspices of the Trades Exhibition Company, there will be held in the Floral Hall, Leicester, from September 29 to November 3, an exhibition similar to those which have been promoted by this company in Plymouth, Derby, Sheffield, and Wolverhampton. Exhibits will be received at the Hall on September 25, and perhaps earlier, by special arrangement. There will be no fewer than seventeen sections, and all will be under the personal management of Mr. George Stanley.

**BRICKS ARCHÆOLOGICAL AND ARCHITECTURAL SOCIETY.**—On the 15th inst. the members and friends of this Association had an excursion to Ruscombe, Waltham St. Lawrence, Shottesbrook and White Waltham, the churches at each place being visited. Ruscombe Church was first visited, and the Rev. J. Henly, the vicar, conducted the party to the edifice, which is dedicated to St. James the Great. Mr. Henly pointed out the older portions of the church, including indications of the twelfth-century work in the chancel, after which the Rev. J. M. Guilding made some remarks, in the course of which he said the church probably was one of the earliest Christian stations in Wessex, belonging at one time to the Bishopric of Sonning. The modern portion of the church showed the great revival of Church life in England after the accession of Charles I. Waltham St. Lawrence Church was next visited, and its principal objects of interest were described by the Rev. G. Neville, the vicar, who said that the lower part of the nave was the oldest portion of the church, the arches probably being of the eleventh or twelfth century work. The tower seemed to have been built in the fourteenth century, and the large window above 1350. The transepts were very old. The top of the tower and parapet were rebuilt probably

two hundred and sixty years ago, the work now proceeding in the tower having been necessitated by the ravages made by the weather. There were remains of flat lead-work, showing that at some time a spire was in existence. At the north-east end of the church was the family vault of the Nevilles of Billingbear. The communion-plate, some fine old woodwork, and the well-preserved carving found in the old church and placed at the back of the pulpit were shown. A drive brought the visitors to Shottesbrook Church, where Mr. W. Ravenscroft, F.S.A., described the chief characteristics. The Hall having been visited, a short visit was afterwards paid to White Waltham Church.

**THE LAING WHARTON AND DOWN CONSTRUCTION SYNDICATE, Limited,** having purchased all the patents, rights, and privileges of the Thomson-Houston system of electric lighting, traction, and power transmission in the United Kingdom of Great Britain and Ireland and the British Possessions in Europe, will, we are informed, in future manufacture its apparatus in England. The Thomson-Houston Company having taken a material interest in the company, the Laing Wharton and Down Construction Syndicate, Limited, with the sanction of the Board of Trade, has changed its name to that of "British Thomson-Houston, Limited," under which style it will do business in future.

**IMPROVEMENT OF AN UNHEALTHY AREA IN ABERDEEN.**—Following on complaints from certain ratepayers, the Medical Officer of Health for Aberdeen (Professor Matthew Hay) has made a representation that the area on the opposite side of the ancient market-place of the city from the Municipal Buildings—viz., that lying between Nos. 55 and 56, Castle Street on the east, Castle Street and Exchange Row on the north, Shiprow (to No. 31 inclusive) on the west, and the open ground in the middle of the said area on the south, is, in his opinion, an unhealthy area, within the meaning of the Housing of the Working Classes Act, 1890, and that the evils connected with the houses, courts, or alleys within the unhealthy area, and the sanitary defects in such area, cannot be effectually remedied otherwise than by an improvement scheme under the statute. Dr. Hay states that the area measures nearly two-thirds of an acre, and that in the ninety-eight dwelling-houses, one house let in lodgings, and five common lodging-houses included in these slums, there is a population of 508, giving only 6.3 square yards to each person. The death-rate in the area is high, the improvement scheme being one of infectious diseases; many of the houses are old and dilapidated, and the great overcrowding and bad arrangement of buildings render it impossible to adequately light and ventilate individual dwelling-houses, and leaving insufficient space for the provision of the necessary sanitary conveniences. The total annual rental of the property is 1,127*l.* odd, and of the occupied dwelling-houses thirty-nine are one-roomed and forty-three two-roomed. There are also thirteen shops and stores and two offices in occupation. The Town Council has resolved to carry out an improvement scheme under Part I. of the statute in question, and to petition the Secretary for Scotland to confirm a provisional order accordingly. The details of the scheme are not all adjusted, but the general idea is for the Town Council to acquire the ground and property under the Act, to remove all but the larger buildings on the margin, to erect a public lavatory, and to provide a terraced open space and a children's playground—the site being in the heart of the East-end. The total cost is estimated at 32,000*l.*, but the properties left will yield an annual rental of 900*l.*, and the statute confers borrowing and rating powers for any deficiency.

**INDEPENDENT CARPENTERS' AND JOINERS' SOCIETY.**—A branch of this society was opened at the Spread Eagle, Usk-road, Battersea, on the 4th inst. The secretary (Mr. Wheeler), in opening the branch, said its object was to form a society of carpenters and joiners to work without the federation ticket, and to allow a man to be free and independent as regards the time he should work, without being dictated to by the advocates of the eight hour movement. He went on to say that they were but young in the field, having been established only about three months; but they were in a fair way of prosperity, and several applications had been received from different parts of London to open other branches. After the officers had been enrolled, twenty-eight nominations were given in. After the lodge was closed, Mr. Osborn, the secretary of the Independent Bricklayers' Society, said it was their intention to open a lodge somewhere near Clapham Junction within a short time.

**WATER ANALYSIS.**—In the report for the month ending July 31, on the composition and quality of daily samples of the water supplied to London, by Mr. W. Crookes, F.R.S., and Professor Dewar, F.R.S., the following paragraph occurs:—"Owing to an unexpected coincidence between the results of analyses of two of the waters, and the repetition of this coincidence for several months past, the conviction has been forced upon us that the samples of water collected for us and presumed to be respectively from the New River and Chelsea main were, through some systematic error, really the same water."

This has now been confirmed by tracing the origin of the samples, which turn out to have been drawn from standpipes, supposed to be supplied by the different companies, but really both supplied by the New River Company. Steps have now been taken which will render such a mistake impossible in the future. Although this erroneous labelling is most unfortunate, it is not altogether to be regretted, as it explains the apparent discrepancy between Dr. Frankland's and our figures in regard to these two supplies, and moreover it gives, indirectly, a confirmatory proof of the extreme accuracy to which water analysis has been brought, and the complete trustworthiness of our own analytical results."

### LEGAL.

#### PARTY-WALLS AT DENMARK HILL.

In the Vacation Court on the 15th inst. the case of *Sloan v. Mulholland* came before Mr. Justice Romer, it being a motion to restrain the defendant from trespassing on the plaintiff's ground by the erection of a wall which the defendant had been running up by the side of the plaintiff's premises, until the trial of the action.

The counsel for the plaintiff said that his client was the owner of certain premises at Denmark Hill, under a long lease. The wall in question was a wall to support a theatre, which was being built by the side of the plaintiff's premises. The property had all been laid out in building-plots, and the plaintiff took his premises on the understanding that the adjoining land would be laid out in the same way. His contention was that the defendant, with full notice of the plaintiff's rights, and after taking certain preliminary steps to conform to those rights, had trespassed upon them by erecting a wall, partly on his own land and partly on the plaintiff's. The defendant said that it was absolutely essential that his theatre should be supported by the wall, and had served the plaintiff with a party-wall notice under the Metropolitan Buildings Act.

Mr. Justice Romer: Does he admit that it is on your land?

The learned counsel replied that he thought the defendant did. What he (defendant) said was that he had proceeded under the Metropolitan Buildings Act.

Mr. Justice Romer: Was there a wall there before?

The learned counsel replied in the affirmative.

Mr. Justice Romer: I think there is a very nice question to be tried, and I won't do it.

The learned counsel said that there were two questions to be tried, and one was as to blocking out the plaintiff's lights. That was a very nice question to be tried.

Mr. Justice Romer: Well, they can be tried together. I won't do it. Do you think I am going to try that now on motion?

The learned counsel replied that the trespass was not disputed.

Mr. Justice Romer: I am not so sure of that. I am not going to decide whether the defendant is entitled to do what he has done under the Metropolitan Buildings Act on motion.

After some further discussion, it was arranged that the motion should stand till the trial.

### CAPITAL AND LABOUR.

**STATE OF EMPLOYMENT IN JULY.**—According to the *Labour Gazette*, the labour market during July continued on the whole to show a downward tendency. Fifty-two Trade Unions, with an aggregate membership of 358,565, have made returns to the Department, showing the total number of unemployed members at the end of July to be 26,576, or 7.4 per cent., compared with 6.3 per cent. for June, and 6.2 per cent. in societies making returns for July, 1893. On the whole, the building trade remains almost stationary, though in certain districts there is a good demand for men. The plumbing and painting branches show a decline. The percentage of unemployed members in unions making returns is 3.6, compared with 3.5 at the end of June. Sixteen disputes took place in the trade during the month, seven of which were due to demands for increased wages and for improved working rules, three to demarcation of work, and the remaining six to questions of unionism and working arrangements.

### MEETINGS.

SATURDAY, AUGUST 25.

*Liverpool Engineering Society.*—Excursion to the Wirral Railway Works and Dee Bridge.  
*Glasgow Architectural Association.*—Visit to New Craig House, McEwan Hall, and University Union, Edinburgh.

SATURDAY, SEPTEMBER 1.

*A.A. Camera Club.*—Visit to Ely Cathedral.

### SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

AUGUST 14.—By Elliott, Son & Doyton: 3, Belsize-grove, Hampstead, u.t. 68 yrs., g.t. 30*l.*, 2,100*l.*; 98,







# The Builder.

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### Building Stones at the Antwerp Exhibition.



THE visit of the Lord Mayor to the Antwerp Exhibition not long since has revived, to a certain extent, the interest felt in that hideous conglomeration of unsightly buildings and tinsel, with its heterogeneous assemblage of exhibits. It will scarcely be credited that some of the latter have only just been finished ready for inspection. The *chateau adrien*—that wonderful conception of laths and match-boarding proposed to be suspended in mid-air by a mass of inflated canvas, in shape partly resembling a "fish out of water," partly the Czar's "circular" yacht, and just about as useful— is exceedingly well-named, for at the present time it is truly a "castle in the air," nothing more. The huge piece of canvas lies on the ground, and for the delectation of visitors is partially inflated with hot air; at intervals small parties are admitted to the interior thereof, the whole proceeding, from the payment of the *droit d'entrée* to the exit, savouring somewhat of the celebrated "white elephant." But perhaps this state of things is covered by the official announcement to the effect that "*Les installations dans les jardins sont celles en cours d'exécution.*"

The less we say as to the classification of the exhibits the better. Those who may be interested in building stones, marbles and the like, will have to search for them in many parts before making themselves acquainted with the whole. Some of the native materials are scattered, without systematic classification, in the principal Belgian section, whilst others will be found in the grounds at the side of the aquarium and *Musée des Beaux-Arts* in company with an odd assortment of granites, sandstones, and marbles from Norway, Sweden, Scotland, and Prussia. The French stones are disposed partly in the principal French section, but also in the hall consecrated to electrical contrivances and machinery, as well as in the grounds, near a section devoted to the Transvaal, and by the aquarium.

Emerging from this state of chaos, and endeavouring to place the exhibits into some sort of order, we perceive that they are, at

any rate, worthy representatives of their class. Dealing first with those raised in Belgium, we are arrested almost on the threshold of the principal building by a fine model of the celebrated quarries at Quenast, on the scale of 4 mm. to one mètre, which provide paving-stone and macadam for many large towns in North-Western Europe; and the material is well-known in the London market. The quarries may be described as two openings, one of which is a vast circular depression, and the other a long, wide cutting. The stone is worked along horizontal shelves in a thoroughly systematic manner, and the method of getting and haulage gearing are well worthy of close examination. As to the stone itself, we have noted its mineral composition and qualities on a former occasion; but, briefly, it may be described as a porphyritic rock, exceedingly hard and tough, and well suited for the heaviest traffic. We learn that the quarries occupy an area of 155 hectares, and employ about 2,400 workmen, with an annual production of—

	Tons.
25,000,000 paving stones = .....	200,000
120,000 cubic mètres of macadam = .....	180,000
70,000 cubic mètres of ballast, gravel, &c. = .....	102,000
Total annual output .....	482,000

M. L. Schreder has erected a trophy in the form of a castellated column of blocks of light blue paving sandstone from his quarries at Souverain-Pré and Esneux; whilst nearby, the proprietors of the large quarries at Lessines have a trophy of their light blue macadam and paving stones, surmounted by a bronze figure of Mercury—a very neat exhibit, contrasting favourably with the disorderly stand opposite, containing many samples of sandstone from the Ben-Ahin quarries, Tirlémont. There is an immense block, about 32 ft. in length, and 18 in. in thickness, of the Carboniferous Limestone, known as *Petit granit de Thiarmon Ecausines*, extremely solid. The term *petit granit* appears to be rather frequently employed for the manufactured product obtained from the Mountain Limestone of Belgium, and is rather misleading. The material is crystalline enough, but in no wise resembles granite; our neighbours, however, are not altogether peculiar in this respect, for similar stone is denominated "granite" in certain parts of the West of England.

Yellow and light-blue sandstone slabs, troughs, and ashlar from Villers-le-Temple and other places (forming one exhibit) are rather ostentatiously labelled to the effect that they strongly resist the deleterious acids of the atmosphere, though whether the block of light-blue stone already stained brown (either from alteration underground when *in situ*, or from exposure to the weather) could sustain its character in that respect is a matter concerning which we prefer to be silent. An attractive exhibit is that of the Société Anonyme des Carrières de Montourdon-Laclairieu (near Virton), consisting of a trophy of yellow sandstone, prominent in which is a poorly-designed fireplace of the same material, picked out with blue stone. Its speckled appearance somewhat detracts from its value from an artistic point of view. The sandstone ashlar, however, has an excellent effect, and is, no doubt, of a durable description. Stone of immense size may be obtained from these quarries; it is said to be practically non-absorbent, and to have a mean "resistance" of 550 kilog. per square centimetre.

The Hainaut quarries at Soignies provide a striking exhibit, being a large slab about 10 ft. by 8 ft., incised and relieved with particulars concerning the stone—a dark-blue limestone (*petit granit*)—and the company which exploits it, from which we glean that the material is used for general building purposes, machine beds, &c., and that the annual output of the workings is from 18,000 to 20,000 cubic mètres. It is also said to be employed for works of art, though in what sense we could not ascertain; if the slab, with its geometrical and trumpey patterns (over which much time and thought have evidently been expended) and flaring advertisement, is to be regarded as a sample or the "works of art," we pity the taste of the designer, and feel for the unfortunate visitors to the Exhibition who are practically compelled to see it as they pass by.

M. Pirmez-Moncheur had some samples of Saint Anne and other marbles of several tints—yellow, dark grey, red, and light-brown—from quarries at Gougny; also, to show their application, two rather plain mantelpieces, one in grey marble and the other red, speckled white, and light bluish-grey. In another part of the building the same exhibitor shows two enormous marble slabs of similar stone. Other marbles are shown from the quarries of Liègne-Ciney. The black with sections of crinoids and

corals, the light grey full of shells, and the red marble are all worthy of mention.

M. E. Rembaux-Roland, of Ecaussines, exhibits a general collection of polished stones, including a cemetery monument in suitable marble of sombre tint (apparently Carboniferous Limestone) about 12 ft. in height. M. Jules Blondeau shows a large polished blue limestone globe on a pedestal, parts of which are fine-axed, from his quarries at Ecaussines, also some building stones. The few other Belgian stone exhibits do not appear to be worth mentioning specifically.

Turning now to the French section we may note, as the best example of its kind in the Exhibition, the massive gateway made of stones from various quarries belonging to the well-known Parisian firm of Civet, Crouet, Gautier & Co., which stands in the grounds near the Transvaal section. The French limestones there represented, which are mostly white and light yellow, are very extensively used in Paris, the North of France, Belgium, and Holland, in the better class of edifices, and the following particulars may therefore not be uninteresting:—

FRENCH BUILDING STONES.			
Uses.	Name of Quarry and Stone.	Weight per cubic metre.	Resistance per square centimetre.
For stone for construction of bridges and monuments, &c.	Saint Vast (fine-grained)	1,750 to 2,000	64 to 68
	" (fine-grained)	1,750 to 2,000	64 to 68
	Saint Martin (fine-grained)	1,750 to 2,000	64 to 68
	Milly (fine-grained)	1,750 to 2,000	64 to 68
For stone for construction of bridges and monuments, &c.	Villiers-Adam (fine-grained)	1,750 to 2,000	64 to 68
	Saint Martin (fine-grained)	1,750 to 2,000	64 to 68
	Milly (fine-grained)	1,750 to 2,000	64 to 68
	Saint Martin (fine-grained)	1,750 to 2,000	64 to 68
For stone for construction of bridges and monuments, &c.	Milly (fine-grained)	1,750 to 2,000	64 to 68
	Saint Martin (fine-grained)	1,750 to 2,000	64 to 68
	Milly (fine-grained)	1,750 to 2,000	64 to 68
	Saint Martin (fine-grained)	1,750 to 2,000	64 to 68

The stones marked \* are employed in the construction of the monumental gateway referred to. The posts round the same are of granite from the Vosges.

Glancing for a moment at the above table, we observe that the majority of the stones are very variable in quality—if we may judge from the results of the experiments. A stone such as that from Lavoux, for instance, the "resistance" of which has such a wide range, must be rather difficult to depend upon; and that from the Morley Forest must be still worse. However, from the samples in the gateway, and from our own observations on some of the freestones when built up, they are fairly durable, though materials of somewhat similar character used in Paris and elsewhere have given birth to various nostrums for the "preservation of stone." The harder limestones mentioned are, as a rule, very durable, but generally difficult to work. In the pavilion behind the gateway are several photographs of various quarries belonging to the firm, which serve to impress the visitor with the enormous magnitude of most of the workings, and of the peculiar character of the machinery used in them.

The nature of the light-grey limestone from the forest of Morley (Meuse) may also be judged from the great block in the grounds near the aquarium, exhibited by M. C. Mauroy, which is about 25 ft. in length, 8 ft. in width, and 1 ft. in thickness. The millstones or buhrstones raised from the Tertiary beds of La Ferté-sous-Jouarre, known all over the world, are rather feebly represented by a few worked specimens in the French section of the Machinery Hall.

It is not the purpose of the present article to describe the sculptured work disposed in various parts of the Exhibition, but passing through the Italian section we could not help noticing the nature of the "marble" used for many of the figures exhibited, which caused us to investigate the matter. The stands in question—those of Sig. Antonino Frilli, of Florence, well-known for productions of this kind—consist of a large number of serpentine and Italian coloured marble pedestals, on which are displayed sculptured small statues, groups of figures, &c., in white stone, some undoubtedly being made of Carrara marble, whilst others (a numerous class) were of a very different kind of stone, though similar to Carrara from a distance, and sufficiently like it to confound anyone but an expert. The courteous exhibitor at once explained to us that the last-mentioned stone was much softer than Carrara, that it contained gypsum, that in order to render it perfectly white it had to undergo special preparation, and that the sculptured work produced was cheaper than real Carrara—from which we imagine the material is a species of alabaster. We have frequently seen this Italian stone on sale at exhibitions and elsewhere, and our readers are more or less familiar with it, but we take this opportunity of saying that it would conduce to a better understanding—to use no stronger term—were the true marble figures to bear distinctive labels. When the two kinds are indiscriminately mixed, an inexperienced purchaser is liable to imagine that the spurious article is true Carrara. The texture and general effect, to say nothing of the workmanship, could not, of course, deceive the expert, nor, perhaps, even the advanced amateur, as to the real nature of "Florentine marble."

The best Scandinavian stone exhibit is by M. Ch. Anker, of Fredrikshald, who shows some marbles similar to those recently on view at the Building Trades' Exhibition at the Agricultural Hall. Portugal is represented by marbles from Estremoz, Cintra, Cascaes and Alcabidêche; and Spain by odd samples exhibited by Barcelona and Malaga firms. Granites, syenites, and porphyries are shown from the Fichtelgebirge, from the same quarries that fourteen large monolithic columns of polished red granite, 5 metres in height, were obtained for the new church of SS. Michael and Peter at Antwerp, near the principal entrance to the Exhibition. M. Michels, of Speicher, near Trèves, who has some red sandstones, was the only other noteworthy German stone exhibitor. But artificial stones of German origin were represented by trophies of Möhl's red and yellow "sandstones," described in our columns some time since; and another by MM. Kampf and Hollender. The Bulgarian geological survey shows a collection of stones for building and decoration from the Principality.

British building stones furnish only one exhibit, by Messrs. Edwards, Macdougall, & Co., of Glasgow, amongst which is a cross of polished Peterhead granite; but some of the stones shown are from Scandinavia, though the source of origin of these latter is not, apparently, indicated. We trust it will not be imagined that the vulgar polished stone with gaudy Labradorite felspar is indigenous to British soil, though we are sorry to see that so much of it has secured a foothold on this side of the Channel—for a certain class of work.

There are a number of slate exhibits, but, not presenting any points of special interest they may be passed over. Asphalt and bitumens of different kinds are also well-represented.

Fire-bricks, and refractory materials generally, come in for a goodly share of recognition. Messrs. J. Grayson, Lowwood, & Co., of Sheffield, and their Antwerp agents, have a stand of silica and ganister bricks and ground ganister. The chemical composition of the ganister bricks is stated to be silica 95.40, alumina 3.10, and lime 1.68. No peroxide of iron, or magnesia, is present. This kind is specially suitable for building the regenera-

tive gas and air chambers of Siemens furnaces, glass furnaces, and others working at intense heat, and subject to intermittent firing. The "Lowwood" silica bricks are adapted for certain open-hearth melting furnaces, Bessemer converters, &c. The ground ganister is used as a lining for furnaces subject to great heat and the fluxing action of metallic oxides; in its application it is merely plastered or rammed to the sides of the furnace over the plates, or the brick, or stone lining. The Walbottle Fire-Brick Company, of Newcastle-on-Tyne, has also a selection of refractory materials for similar purposes, including bricks, tiles, lumps, retorts, &c. An analysis of the earth of which the "Walbottle" products are made is given as follows:

ANALYSIS OF FIRE-CLAY.	
Silica .....	64.15
Alumina .....	31.52
Peroxide of iron .....	1.43
Lime .....	.29
Manganese .....	.63
Potassium .....	1.82
Soda .....	.31

100.15

Messrs. N. B. Allen & Co., of Cannon-street, and the Glenboig Union Fire-clay Company, Limited, likewise exhibit fire-bricks and other refractory products.

In cements the Belgian section is naturally very strong. We noticed the elaborate trophy of the Compagnie Générale des Ciments Portland de l'Escaut, Tournai, built of dark blue Carboniferous Limestone, from which Roman and Portland cements, lime, &c., are made. The same stone is also, in a lesser degree, used for building purposes. The company employs some 600 workmen, and the estimated output for the present year is 75,000 tons. MM. Dumon & Cie., of Tournai, have also a good show of cements, lime, and stone—and there are many other exhibits of the same character.

Altogether, the Antwerp Exhibition is great in materials of construction, and the building industry generally is exceedingly well represented; but the "classification" adopted is so atrocious that it is next to impossible to thoroughly appreciate this.

## THE PLANNING OF PUBLIC LIBRARIES.

By G. WASHINGTON BROWNE, A.R.S.A.

THE Planning of Public Libraries is a subject which, following upon the adoption of the Public Libraries' Act, is undergoing a development similar to that through which school-planning passed following the adoption of the Education Acts of 1870 and 72, and the establishment of School Boards. The principles of Board School planning are now reduced to something like an exact science, and the requirements are set forth and printed in a code of rules. The principles underlying the planning of Public Libraries are not yet universally acknowledged, and the requirements have not yet been reduced to a code, and it appeared to me that any contribution, however imperfect or inadequate, which might tend towards the establishment of such principles, or lead to a clearer appreciation of the requirements of a Public Library, might not be without interest.

Four hundred years seems a long interval of time between the production of the first printed book and the establishment of Municipal Libraries under a popular Act of Parliament. In 1455, or early in 1456, the first book printed with movable types—the so-called "Gutenberg Bible," called also the Mazarine Bible—was issued from the Mayence press, and in 1855 the ineffective William Ewart Act of 1850 was repealed and the present Public Libraries Act passed.

The erection of Caxton's printing-press in the precincts of Westminster Abbey, 1475 or 1476, carries us back more than half-way to the landing of the Conqueror, and helps



us to measure the long interval between the invention of printing and the establishment of Public Libraries on a popular basis. Not that libraries, private or public, are an invention of this generation, or are even the outcome of the invention of printing. Far otherwise. Ere the preacher's day, it might have been said with truth "of making many books there is no end," and when Job, in ending his words, gave vent to the anguish of his soul in the expressed desire that his adversary had written a book, it is beyond all doubt that Public Libraries had long been established. There is clear proof that Nineveh, that great city, possessed a Public Library, the works in which were of clay tablets, ranging in size from 1 in. to 12 in. square. Egyptian libraries, chiefly of sacred books, were in existence 2,000 years before Christ, while Greece and Rome had many libraries, public and private. Nor were these ancient libraries scantily furnished with books, if the traditions concerning them are reliable.

Recent investigation has shown that the number of books, the multiplication of copies, and extent of editions, before the invention of printing, was much greater than was for long time supposed. In Rome especially, the character of the book trade appears, upon examination, very different from what is popularly assumed; and dissimilar as were the conditions of book production from those of modern times, there are many points of analogy between what may be called the publishing trade of ancient Rome and that of our own day. Then, as now, there were wealthy and enterprising firms or individuals who stood between the authors and the public, and who employed the cheap, though tedious, resource of slave labour in the transcription of books in what it is impossible not to believe must have been, at least occasionally, large editions. Pliny, in one of his letters speaks of one of his friends, Regulus, getting a thousand copies written of a book which he composed on occasion of the death of his son; and when Augustus confiscated and ordered to be destroyed all the copies of the false Sibylline Books, the number of copies destroyed was more than two thousand. Indeed, it is hard to suppose that the general supply of books was other than abundant, considering the comparatively low price at which copies of the works of even popular authors were sold. The first book of Martial's "Epigrams," which contains a hundred and nineteen epigrams, was sold in handsome binding for five denarii—within a fraction of three shillings; and in a cheaper binding for between six and ten sesterii—from a shilling to one and eightpence. For the thirteenth book, which is about one-third shorter, the publishers charged four sesterii, but Martial, who had probably sold his copyright, complains that this price is too high, and that a fair profit might be had by selling it for half that sum. From these prices it may be inferred that there was no scant supply of copies in the market; and, besides the copyists employed by the trade, each large household had among its slaves one or more (called "librarius") whose office was to copy books; and even the ladies of the household had their "librarian" for the same purpose.

During the dark ages following the barbarian invasions and the downfall of the Roman Empire the history of letters and of their external representative, libraries, is almost a blank. Throughout that long period the monastic bodies stand all but alone as book collectors and book preservers. Though in the "Scriptorium" the hooded monk wrought with cunning hand innumerable manuscripts, which for beauty of calligraphy stand admired and unrivalled at the present day, yet, judging by the extant catalogues, their store of books was scanty enough. Even the libraries of rich cathedrals and of Imperial families were numerically of small account. Thus the cathedral library of Ratisbon in 1251 had but 400 volumes; the catalogue of Christ Church, Canterbury,

printed by Mr. Edward Edwards, author of "Memoirs of Libraries," contains but 698 volumes. The library of Fulda, founded by Charlemagne, contained 774 volumes. The royal library of France in 1374 had but 910, and that of the Surbonne itself, in 1392, barely reached the number of 1,000. If the reputed figures of the ancient libraries previously quoted are even approximately correct, one can only regard the small quantity preserved to us, merely as samples of the older literature of the world, and speculate whether the law of the survival of the fittest has been in operation in their preservation.

With the revival of letters the modern history of libraries may be said to commence. They began as manuscript collections, and but slowly availed themselves of the novel facilities for reproduction afforded by the printing-press. As illustrating the tenacity with which the guardians or directors of great libraries adhered to the collection of manuscripts and rejected the newer method of book production, one may mention that, when in 1624 Cardinal de Rochefoucauld became Abbot of St. Geneviève, its library, now one of the most important libraries for the actual uses of study in Paris, did not contain a single printed volume; and even that which was long held to be immeasurably the greatest of modern libraries, the National Library of Paris, contained in 1547 barely 200 volumes of printed books.

The conditions under which the books in ancient libraries were accessible to outside readers are unknown to us; and the restrictions imposed upon their use in the earlier of the modern libraries are both interesting and amusing. The rarity of books in Mediæval times, and the expense of duplicating them under the process then alone available, may sufficiently account for the regulation of the library of the Abbey of Croiland. There the "lending of books, as well the smaller without pictures, as the larger with pictures, any loan is forbidden under no less a penalty than that of excommunication." Even after the invention of printing the restrictions upon borrowing are only less stringent. In the year 1471, when Louis XI. wished to borrow a book from the Medical Faculty of Paris, he was required to deposit plate in pledge, and to get one of his nobles to join him in a guarantee for the safe return of the book. A century later we read, "two persons must always be present before any volume could be consulted in the library of Corpus Christi, Cambridge; one Master or Fellow of the college, the other Fellow or scholar. Should longer use of the books be necessary they may be removed to one of the Fellows' rooms, not more than three at a time, and after due registration, but beyond the college buildings they must never go," and I am not sure but these regulations and restrictions hold good to this day. In the earlier libraries the books were not placed vertically upon shelves as at present, but were laid upon their sides, and, where open to the public, generally attached by chains to their shelf or desk, so that they could only be consulted there and not carried away. This is well shown in the photograph of the Laurenzian Library, Florence (exhibited). It was this practice of laying the books upon their sides that led to the highly-decorated and generally artistic bindings, some beautiful specimens of which are visible in the photograph.

Though man seemed slow to learn the lesson that the greatest use of books is publicity, the grievous restrictions imposed upon their use in the earlier libraries were gradually relaxed, and great collections were by-and-by built up, not only in the capitals, but also in the numerous seats of learning throughout Europe. But these, after all, were national and academic rather than local, and though nominally public remained practically accessible only to the few, scholars and students, or those professionally engaged in literature, and in nearly all of them the borrowing of books was prohibited. These

are not, in any sense, citizens' libraries, and they lack the two great popular elements—contemporary journalism and the privilege of borrowing. It was to facilitate and encourage the establishment of libraries on these more popular and liberal lines in every municipality throughout the kingdom that the Public Libraries Act of 1855 was passed for England and that of 1867 for Scotland. And here let me in passing enter a protest against the term *Free Library*, and an appeal for the universal adoption of the term "Public Library," as being at once the more correct and the more noble term. The Act of Parliament for promoting the establishment of Municipal Libraries is intitled "Public Libraries Act, 1855," and the second clause runs thus: "In citing this Act for any purposes whatever it shall be sufficient to use the expression 'The Public Libraries Act, 1855'" and from the beginning to the end of the Act no other phrase than "Public Libraries" is used. It is true the Act provides in Clause XXV. that "the admission to all libraries and museums established under this Act shall be open to the public, free of all charge," but then it provides under Clause XV. for the levying of a rate for the purposes of the Act. Our parks and gardens are similarly provided and maintained from the rates, and admission to them is equally free of charge, yet no one thinks of calling them free parks, but public parks. Let the same term be applied to the Municipal Libraries, that the citizens may feel when making free use of them, they are but using their own property, paid for with their own money.

In considering the subject I shall endeavour to set forth the requirements of such a library, and refer to a few typical examples of how these requirements have been well met. It may seem something very like vanity to place my own design for the Edinburgh Public Library in such a group, but the eulogies that have been passed upon it by disinterested writers, and my familiarity with the working out of its conditions and requirements, must be my excuses for its position in this group, and the frequent references I must perforce make to it throughout the paper. And here, let me say, that, thanks to Mr. Carnegie's munificent gift, this library is planned upon a more liberal scale than is usual in buildings erected under the Act.

From the outset the architect has to consider that he has two sorts of accommodation to provide for—one, of the public who are to use the books; the other, of the books themselves, with which may be linked the staff who are their guardians. In all public libraries there are three distinct departments for the accommodation of three different classes of literature, and which, one might say, are used by three different classes of the community. These are the *news-room*, for newspapers, daily and weekly, and the more popular of the weekly and monthly journals and magazines, and frequented chiefly by the artisan and industrial class, employed and unemployed; the *lending library*, used by the general reader, male and female, for borrowing and returning books for what may be called household reading; and the *reference library*, the volumes in which can only be consulted—not borrowed—and used chiefly by the student, the *littérateur*, and the specialist. Besides the bound volumes under custody on the shelves, the current number of the higher class of professional, artistic, and scientific journals, and the monthly and quarterly reviews, are generally displayed upon the tables of the reference department, and are available to the reader without application to the librarian.

The purposes for which the public use these three departments determine their nearness to or remoteness from the principal entrance. The lending department, in which no reading is done, but in which the work is merely that of borrowing, returning, exchanging, and renewing volumes, and which, in the interest alike of the public and the staff, should be done speedily, is consequently



placed as near the entrance, and in as direct a line with it, as possible. The news-room, into which people drop for half-an-hour, to read a newspaper or a journal, may be further removed from the entrance; while the reference-room, used for the more serious purposes of study and research, should be most remote from the entrance, to secure it against the noise and stir of the traffic to the other departments. In buildings, therefore, in which all three departments are upon one floor, the lending-room should preferably be in the centre, opposite the entrance, with the news-room upon one side and the reference-room upon the other.

Such an arrangement, while simplest for the public, is also best for the staff. The librarian would be, for the most part, engaged in the lending department, and from his service-counter can not only command the entrance-hall, but by glass screens can supervise and control the reading-rooms on either side, as at Brechin and Southampton.

Though the question of orientation does not enter largely into the subject of library planning, one would naturally, where the choice is open, place the news-room upon the south side, where the sun, entering through the windows, would have no valuable bindings to destroy, and would not so much disturb the cursory reader of a magazine as it would a more serious student in the reference library.

But it is only with the smaller libraries, or on exceptionally large sites, that all three departments can be placed on one floor. If two departments only can be placed upon one floor, then let the lending library and the news-room be upon the entrance level, and the reference-room above, as at Chelsea; and if the smallness of the site or the largeness of the rooms permits of only one department upon each floor level, then let the lending-room be upon the street level, the news-room upon the first floor, and the reference-room upon the second floor up—unless, indeed, you have a site like that in Edinburgh, where the principal entrance is from a street at a level of 48 ft. above the ground upon which the building rests. In this case the lending library is placed upon the entrance level, the news-room upon the floor immediately below it, and the reference-room upon the floor immediately above it; the best arrangement possible where the three departments must be upon different floors. Sometimes this disposition of the departments is managed by placing the news-room in a semi-basement, a single flight of steps below the entrance level, with the lending-room a single flight above the entrance, and the reference-room over that again. Whether the library be planned upon one, two, or three floors, the approach to all the departments from the principal entrance must, of course, be obvious and easy, not tortuous and obscure. There must be no groping about or wandering from one floor or part of a building to another in search of the department wanted. Immediately on entering the hall the visitor should be directed by door-plates or finger-posts to the department he wishes to reach; and, as the traffic to and from all departments converges in the entrance hall, it must be spacious and well lighted.

The position of the librarian's room is of some importance, and calls for a little consideration. I have seen it planned as a little box of a place enclosed within glazed screens, in the very heart of a building and upon a raised level like the captain's bridge placed amidships, as though the principal librarian stood there and shouted his commands to the several members of his staff in the different departments. This is not the position the librarian likes. He prefers to be not too much in the eye of the public. When in his room he has work to do, in which he cannot afford to be interrupted by the idler, the gossip, or the faddist, all of whom frequent the public library. His room should be placed less with reference to the public and more with reference to his staff,

in a position where he can be conveniently found by his staff, and from which he can readily control them; and if from his room he can see the frequenters of the library without being seen of them, so much the better; but one must remember that the principal librarian is not the hall porter.

The question whether there ought to be separate reading rooms for ladies and for juveniles is generally answered in the affirmative, though the practice is by no means universal, and there is much to be said on the side of the dissenters. The first objection against separate rooms is that it involves two additional attendants, and in most cases this is a serious, and in many cases an impossible, increase in the number of the working staff. Again it is urged that if ladies sit side by side with the sterner sex in church and theatre, in railway carriage and tramway car, why may they not occupy the same apartment to read in? In the Edinburgh library it was originally intended to have a separate room, but when the committee came to consider the question in detail, they by a unanimous vote reversed their first intention. The ladies are accommodated at separate tables reserved exclusively for them in one of the arms of the reference library, an arrangement that seems to answer well.

Against a separate room for juveniles the objection of an additional attendant holds equally as with the ladies' room, while it is further urged that the youngsters are more likely to be quiet and orderly if in the presence of their elders than they would be in a room by themselves, and that the restraint imposed by their elders is a salutary discipline. In the Edinburgh library they have a separate room containing a lending department of books specially selected for juvenile readers. In this room they may either read the books or sample their selection before carrying it home for reading there. This room is only opened after school-hours in the afternoon and upon Saturdays, and presents often the brightest and cheeriest scene in the whole building.

If separate rooms are provided, the juveniles should not be permitted to penetrate the building unnecessarily far beyond the entrance hall, and their room should be in the direction of the news-room, where, the reading being of a less serious kind than in the reference room, less disturbance would be produced by the noise of the youngsters; while the ladies' room should be placed near to, or *en suite* with, the reference library, both on account of the retired situation, and for convenience in supplying them with the books they may desire to consult.

In addition to these rooms for the public there must also be provided sufficient accommodation for the working of the institution by the staff, as well as rooms for the members of the staff. Where there are both male and female attendants separate rooms must be provided for the sexes as hat and cloak rooms, and where they can take lunch or rest when off duty. There must be a bookbinders' room, for though it is generally better and cheaper to have the books bound by the trade, repairs and mendings are done within the building. There must be a cataloguing room where new books are received, examined, recorded, catalogued, and numbered for reference or lending-room, as the case may be, and dispatched to their proper place on the shelves. Above all, there must be large storage accommodation for files of newspapers, for receiving and collating the weekly and monthly issues of magazines during the year, the current number only being displayed in the library, and the others preserved for binding at the end of the year; also for books which may be from time to time weeded out of the lending library, as no longer asked for, to make room for newer works that are in demand. For these and innumerable other purposes ample storage accommodation is a necessity upon which every librarian to whom I have spoken has insisted with greater or less vehemence.

**News-Room.**—Coming now to consider in more detail the requirements of each of the three main departments of the Public Library, we may take the news-room, or light literature department, first, as being, perhaps, least complex in its arrangement. This, as already mentioned, is for daily and weekly newspapers, and for the lighter periodicals, which are displayed upon tables and stands, to be used by all without application to the librarian. In some libraries, separate rooms are provided for these two classes, and you find a newspaper-room and a general reading-room. I am against such division of departments into separate rooms, involving additional staff and increasing the difficulties of supervision. It is true the newspaper readers are a migrating lot, coming sometimes but to read a single paragraph, or learn the result of a single race, and their coming and going necessarily disturbs the magazine readers. That can be provided against, in some degree, by grouping the newspaper stands together in that part of the room nearest the door, and placing the magazine tables at the further end, as in the Chelsea Library, and, in a less marked way, in the Edinburgh Library; or, better still, for the mutual protection of both sets of readers, if the door can be arranged near the centre of the room, with the newspaper stands on one hand, and the magazine tables on the other.

The magazine readers are accommodated with tables and chairs, the chairs being arranged along both sides of the tables to economise space. The tables, which are the ordinary height of about 30 in., should not be less than 3 ft. 6 in. broad. At Edinburgh they are made 3 ft. 6 in. broad, after careful comparison and consideration. In Birmingham they are as much as 5 ft. 3 in. broad, but that is excessive, and wastes space. At Leeds they are 4 ft. broad. A lineal allowance of 2 ft. to 2 ft. 3 in. per reader is necessary, and the tables must be spaced at such a distance apart as will allow free passage between the backs of the chairs of adjacent tables.

The result of this spacing, with, of course, the necessary access passages along the ends of the tables, is that an area of about 20 superficial feet per reader is absorbed. This is a liberal allowance; and 18 superficial feet per reader is the least allowance that can be made, consistent with a fair degree of comfort to the readers. Of course, this includes the space occupied by tables and chairs. On the table here given the figures are:—Edinburgh, 22; Chelsea, 17½; Southampton, 20½; average of these three, 20 square feet per reader. Brechin is exceptionally, and I fear, uncomfortably, low at 12 ft. per reader, and I have not the plan of the news-room at Aberdeen. The tables should be arranged at right-angles to the windows, to allow the light to strike along their length, free from the shadows of readers.

Various methods are in use for enabling a visitor to find the particular journal he may wish to consult. The simplest method is to have an index fixed at the end of each table containing a list of the journals which lie upon that table, somewhat after the manner of the seatholders' cards at the end of church pews, but on a larger scale, so as to be easier read. A second method is to have a book-rest along the centre of each table, with space along the top for the name. The names can thus be easily read across the room, and the presence of the journal upon the rest would notify that it was not in use, while its absence would indicate that it was in use. One objection to this arrangement is that it reduces the amount of moral supervision which the readers upon opposite sides of a table unconsciously exercise over each other, and which is an important factor in deterring evil-doers from injuring the magazines. A third method is to have magazine racks in convenient positions, constructed after the model of the old-fashioned kitchen plate-rack, but so contrived for economy of space that the magazines overlap each other, and only



their tops project above the dividing-spar which bears their name. This would be an excellent arrangement if it would work, but it is too much to expect of the ordinary reader that he will take the trouble to replace a journal in its proper place upon the rack, or even in the rack at all, when he has done with it. In placé of public resort the simplest arrangements are the best, and those only are to be relied upon that ask nothing of the user; so, after all, the simple method of the index-plate at the end of the table is the best, as it asks nothing of the reader but that he shall leave the journal where he sat, which, under any arrangement, he is pretty sure to do.

The newspaper reader has less consideration shown him than the magazine reader, inasmuch as he is not provided with a seat, but must stand up to his paper. Familiar as we all are with our morning newspaper, I dare say, if asked the size of it, the answers would be as various and as wide of the mark as those usually hazarded as to the height of a tall hat. The *Scotsman* is 2 ft. 3 in. high, and, when opened out to the double page, 3 ft. 8 in. broad; the *Glasgow Herald* is 2 ft. 2½ in. high, and 3 ft. 5 in. broad over the double page; while the *Times* is 24½ in. high and 37 in. wide.

These newspapers are arranged upon stands specially designed to receive them, and to which they are attached by Cumming's patent fastener, a clever arrangement, which keeps them firmly fixed in position, and is readily unlocked for removing the old and refixing the new issue each morning. The desks or sides of the stand upon which the papers rest slope at the angle of 60 degrees,\* so that in a double stand the two sides form, with the base, an equilateral triangle, each side of which measures, say, 2 ft. 6 in. The lower edge of the desk is 3 ft. 3 in. above the floor, and the top about 5 ft. 4½ in., which places the newspaper at a convenient height for the eye. An allowance of 4 lineal feet per newspaper should be given, and the length of the stands consequently some multiple of that unit. A top rail along the apex receives the name of the newspaper, so that the reader may easily find the one he wishes to consult.

Though the readers, as I have said, have to stand to their newspapers, yet man seems physically incapable of supporting himself erect and reading at the same time. He must lean upon something, and if you don't give him anything better he will lean upon the newspaper and tear it in the process. Consequently a rest is provided consisting of a strong rail of brass or iron tubing projecting about 3 in. from the bottom ledge of the desk and supported by strong iron brackets.

The newspaper-stands, like the reading-tables, should be placed at right-angles to the windows, or they may be very conveniently placed, if of single construction, i.e., with one sloping side only, along the wall under the window sills, if the sills are 6 ft. above the floor level, which they may with advantage be. When placed in successive rows they should not be spaced closer than 9 ft. centres. The spacing at Chelsea is 8 ft., which will just do; at Brechin, 6 ft. 6 in., which will not do; and at Edinburgh, 13 ft. 6 in., to suit the architecture.

The requirements of the general reading-room or news-room, therefore, are very simple. The chief points are to have a sufficient floor area, 18 ft. to 20 ft. per reader. Do not seat the readers too closely at the tables, never less than 24 in. each, and as near 30 in. as possible. Leave the passages and gangways between tables and newspaper-stands sufficiently wide to enable anyone to pass through without disturbing the readers on either side, and place the tables and stands at right-angles to the light.

[To be concluded in our next issue.]

## NOTES.

**S**OME of the Scotch miners object very strongly to the strike pay from their English brethren being seasoned with advice. Certainly, they are counselled to reduce their demand from 1s. per day advance to 6d., and they doubtless think that their advisers would not be so ready to urge their own men to accept "half a loaf." At a conference between the Scotch delegates and a deputation from the English Miners' Federation last Saturday, it was decided, after a quarrelsome discussion, to submit the proposal to the men by ballot. The result is not known at the time of writing, and, seeing that the action of the Federation was characterised as "a brazen-faced piece of impertinence," it will not be surprising if their suggestion is rejected. It is safe to predict, however, that the strike will ultimately be settled on these lines, if not immediately. Only a section of the men are likely to endorse such intemperate language as that quoted, and many will be glad to adopt a compromise. If a settlement can be arrived at on the lines suggested at any of the pits now idle, the end cannot be long delayed; and, seeing that 630,000<sup>l</sup>. have already been lost in wages, and that 6,500,000 tons less coal has been raised through the stoppage, an honourable settlement should be welcomed by both sides.

**T**HE death of Mr. Henry Faija, at the early age of forty-nine, has cut short unexpectedly the career of a member of the engineering profession who was in his own particular line a singularly thorough and acute observer and experimenter, and who, as the best authority of the day on the use and properties of Portland cement, was brought often into touch with the architectural profession, who are indebted to him for the accurate data which he furnished for them in regard to an important element in the construction of large buildings. Mr. Faija was the author of the set of articles on "Lime, Cement, and their Uses," which appeared in our "Student's Column," from January 3 to January 24, 1885. An example of his ingenuity was shown in his very clever and scientific invention of a ball-tap flushing cistern, in which the tap ran full bore up to the moment when the cistern was filled, so that when empty it filled again in a few seconds, instead of by the slow and diminishing dribble of the ordinary ball-tap. He furnished us, at our request, with a diagram of this, which we published in our issue for December 24, 1892. The last occasion when we saw Mr. Faija was when we called at his office to see the working of this cistern, over which he had spent a good deal of pains solely for his own satisfaction in solving the problem, and without any idea of turning it to pecuniary account, of which he had never thought; he seemed quite content with the practical success of his contrivance.

**S**UBSCRIPTIONS are invited towards a fund for repairing the chancel and sacristy, and refitting the interior of the parish church at Clonfert, which, until the death of the Bishop of Killaloe sixty years ago, had formed the cathedral of a diocese which was one of the six that constituted the ecclesiastical province of Tuam. The abbey church, founded there circa 560 by St. Brendan, son of Finlogha, took its full share of troubles in Ireland, for it was burnt six times during the period 744-1179, and in the interval 949-1065 was plundered thrice; in 1541 both church and monastery were almost destroyed. Bishop Dawson (appointed 1627) rebuilt the palace, and Bishop Wolley (1664) repaired the fabric. A diversity of opinion exists whether the west front, including its fine portal, was erected by Bishop John, an Italian (1266-1296), as Ware considers it

was. Mr. R. R. Brash\* says, "the work [of the portal] is certainly a century earlier," and is disposed to assign it to Peter O'Mordha, a Cistercian monk, and first Abbot of Boyle, who became Bishop of Clonfert, and was drowned in the Shannon in 1171. He thinks, too, that O'Mordha erected the nave, rebuilt, in part, in the latter end of the fourteenth century or beginning of the fifteenth. Clonfert's chief glories are its porch beneath an acutely-pitched gable, at the west end, and the east window, of which Mr. Brash gives detailed descriptions. Constructed of a reddish grey gristone, the door-head measuring 7 ft. to the top of the capitals, and 13 ft. 4 in. in width at base, from out to out of the external piers, has six orders of arches, resting on the same number of inclining jamb-shafts and piers at each side, and having capitals richly sculptured with dogs' heads in the hollows under the square abaci; the bells are grotesque human and animal heads. He writes:—

The entire surfaces of the piers and jamb-shafts are covered with an amazing variety of ornament, showing a marvellous fertility of invention. . . The bases are unfortunately buried in the earth. . . The soffits of every member, as well as the faces, are carved; in fact, there is not a square inch of any portion of this beautiful doorway without the mark of the sculptor's tool, every bit of the work being finished with the greatest accuracy.

The tower, square on plan and in three stages, with an embattled parapet, has been built within the nave, its front wall resting on the original west gable. The chancel, 27½ ft. by 22 ft. broad, and the oldest part of the fabric, has an east window, of dark, close-grained limestone, like that of Temple Righ, at Clonmacnoise. It consists of two semi-circular-headed openings, each 8 ft. high from sill to soffit, and 12½ in. wide externally, but with jambs splayed to an inner width of 7 ft. 6 in. The exterior and inner angles are moulded; the splays have each, two round-headed panels; the inside sills finish with a string on which rest the moulded bases of slender shafts with carved caps from which spring the arch members. The other window-openings are more modern. The nave, of limestone, measures 54 ft. by 27 ft. 6 in. in the clear; the north transept is gone, of the south transept the walls remain. The transepts stand at nearly the centre of the nave; on the chancel's west side is a sacristy, 24 ft. by 13 ft. interior dimensions, and covered with a pointed vault. Mr. Brash is of opinion that the chancel window is, perhaps, late tenth century or beginning of the eleventh century in date.

**I**T has lately been the custom to publish a descriptive volume on each city visited by the German architects on the occasion of their biennial gatherings. This time the city is Strasburg, and hence a bulky "Strasburg and its Buildings" has been added to the series, which so far has illustrated Hamburg, Cologne, Frankfurt, and Leipsic. The new volume, like the others, practically explains everything of interest connected with the city. There are 670 pages of text and 650 woodcuts, besides a number of plates, and the numerous collaborators include nearly every expert in Strasburg, from the learned archaeologist to the Royal Engineer in charge of the military works. In time every German city of importance will be described in this way, as the scene of the Congress always changes, and a most valuable collection will be formed. It is a pity we have no occasion for similar publications on our many interesting towns. The dates, plans, &c., would be invaluable for reference as well as study. In Germany it is always the local architectural society that takes the matter in hand, finds its honorary editors, and a publisher who is enthusiastic enough about his city to print the volume at cost price.

**A**CCORDING to our German contemporaries the Architectural Room of the

\* "Ecclesiastical Architecture of Ireland." Dublin 1875. 4to.

\* This is surely too great a deviation from the perpendicular for comfortable reading; and for short-sighted readers the upper portion of the sheet would be thrown too far from the eye.—E.D.



Munich International Art Exhibition is not as good as the Berlin one referred to last week, and it is by no means as "international" as might have been expected. Munich has been very active of late in architectural matters. There have been interesting competitions for the proposed National Museum, the proposed "Artists' Home," and a number of important municipal buildings are being erected. These works, however, are not represented in the Exhibition, and were it not for Professor Thiersch's new Law Courts no drawings of Bavarian monumental work would be on the walls. Berlin is only represented by Herr Heim, who exhibits drawings of three new hotels. England's only representative is apparently Mr. Edis, who has sent drawings of the two Constitutional Clubs and a Convalescent Home. Messrs. Ernst & Koch, of Zurich, and M. la Roche, of Bale, represent Switzerland. An "International" Architectural Room of this kind is really a farce—it is not even a national one.

MANY persons will hear with regret that the ancient papal city of Avignon is to undergo extensive "street improvements," which, we are informed, will, to a great extent, change its character and destroy much of its archaeological interest. Of course, the modern inhabitants of a city have the stronger claim in such a case, if the convenience or healthfulness of their daily lives is really concerned in the changes; but it is melancholy to see all the relics of ancient and mediæval Europe one by one slipping away from us in this way.

THE Frederick Church, better known as the "Marble Church," at Copenhagen, was inaugurated on the 19th inst., and will henceforward practically be the cathedral of this city. We have before referred to the curious history of the building, which commences as far back as 1749. In that year Colonel Eigsved prepared the design for the building, by order of the Danish Government, and at once commenced carrying out his plans. A French architect, M. Jardin, succeeded him, and at the end of 1770 the building was some 75 ft. above ground, and had cost some five million Danish crowns. Building operations then ceased, or were only carried on in a desultory way until 1874, when the Privy Councillor Tiegen offered to complete the monument at his own expense and present it to the country. The President of the Danish Royal Academy, Herr P. Meldahl, was Herr Tiegen's architect. The original design was modified, and we may say, improved on, and though the works continued at a much slower rate than need have been, the results, at all events, are good. We hope to illustrate the building on an early occasion; so at present we only mention that the main feature of the church is a Renaissance dome, the diameter of which measures about 100 ft. It has been built in an excellent Norwegian marble. Its position is an unfortunate one, as it is hemmed in on all sides by tenement buildings.

FROM the current number of the "Journal of the Franklin Institute" we gather that American practice in the heating and ventilation of large public buildings is tending to the adoption of the method of ventilating from the top to the bottom of a room, which, as we have repeatedly pointed out, is only possible when electric lighting is used, and even then has its disadvantages—indeed this is recognised to some extent by the provision of alternative openings, so that on occasion the current of air may be ascensive rather than descensive. We also note that a point is observed which is too often overlooked, the necessity for an automatic, or at least easily-regulated and well-managed, alteration of the temperature of incoming fresh air in the ventilation of many rooms, as

auditoriums, theatres, ball-rooms, and public dining-halls, where a stable condition of the audience, lighting, &c., is not assured.

UNDER the head of "Sweating in the Government Departments," Mr. Hyndman addressed last week a communication to the Press to justify a statement recently made by him to the above effect at a public meeting. We have nothing to do with the details of most part of this letter, but the fifth head of Mr. Hyndman's indictment was that "The Post Office work is frequently done under most insanitary conditions, in cellars, at the backs of shops, and the like, to the permanent injury of the health of the men and women employed." The accusation would on this point have been more effective had the writer given details to support the statement. There is no doubt, however, that in many of the shop post-offices there is both insufficient space and light, and work is often done under very unsatisfactory conditions. To a certain extent the Post Office is not to blame for this, since the persons who own these shops are responsible for the premises. At the same time, the Post Office might well be more stringent in requiring persons who are proprietors of shops, and who wish to have post-offices in them, to put their premises into a better sanitary state. There is no doubt also that, since the Post Office Department is worked at a considerable profit, the country will expect every day more from it, and that its servants should be well paid and well housed. *Prima facie* a Government Department is not intended to be a profit-making concern. It may be very desirable that, if possible, it should be self-supporting, but when it does more than this, and brings in a large amount of net profit, it is to a certain extent going beyond its proper sphere, as long as any conveniences are unsupplied to the public, and anything necessary is wanting to the health of its workpeople.

AS the summer draws off and the darker days approach it is desirable again to call attention to the disgraceful way in which the stations of the Metropolitan and the District Railways are lighted. At many stations, it is true, there is not much difference between summer and winter, but still in the winter more artificial light is required on the whole length of line. It is high time that the Board of Trade put some pressure on these two companies in this respect. Even a roomy station such as Mark Lane is always in a state of semi-darkness, and some of the smaller ones, such as Gower-street and Baker-street, are never properly lighted. It is all very well for these companies to say that they are not in a flourishing financial condition. That is no answer to the present complaint. The companies are bound to give reasonable conveniences of travel to the public, and if a station is so dark as to be absolutely dangerous, then the company is not fulfilling the implied contract which it makes with the public when it obtains a monopoly for a particular work. We may also call attention to the dangerous character of Baker-street and Victoria Stations, the platforms of which are now too small for the ordinary daily traffic, not to speak of the traffic on special occasions.

WE have before pointed out the trouble which is constantly caused by plans being sent to us for reproduction, much wider than the width of our page, and therefore requiring to be much reduced in photographing, but in which the lettering is written the ordinary size, and, therefore, in reduction, becomes nearly illegible. As this simple and (we should have supposed) obvious fact seems, however, to be still unintelligible to the majority of draughtsmen, we append an object-lesson in the shape of a

reproduction of the same writing on three different scales:—

No. 1.

ENTRANCE

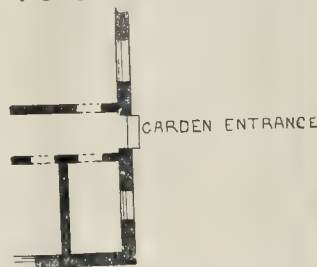
No. 2.

ENTRANCE

No. 3.

ENTRANCE

Here No. 2 is exactly half the size of No. 1, and No. 3 half the size of No. 2. The width of our page is seven inches, and except in the case of large and important plans to which a whole page must have their length reproduced as blocks must have their length restricted to seven inches.\* If the original plan, therefore, is about fifteen inches long, any writing on it, to appear as No. 3 in the above example, must be written as large as No. 2. If the original plan is somewhere about 2 ft. long (as it often is), writing to appear as No. 3 must be written at least as large as No. 1. We hope this illustration will avail to render clear a very simple matter, which we are unfortunately under the necessity of explaining in private correspondence nearly every week, and often to no purpose.† Another point to be borne in mind in preparing plans for publication as blocks in the text, is that any accompaniments to the plan, such as title, scale, &c. should be arranged as compactly as possible, so as not to extend beyond the width occupied by the plan itself. For instance, if the accompanying diagram be taken to represent part



of the right-hand margin of a plan, with the words "garden entrance" written out at right-angles to the wall as shown here, the size of the block must be fixed by the point to which that writing extends, and all the space above and below those words is entirely wasted, and is only so much blank paper. The same with scales, north points, &c., which are often put far away in the margin of the drawing, and have to be cut out and pasted on or re-drawn close up to it; all which trouble would be saved if draughtsmen would bear in mind the conditions under which plans for publication in the text have to be produced. The matter is of consequence to the authors of the plans as well as to ourselves, as we are often obliged to refuse a plan or send it back to be re-drawn, because it is drawn so that the whole of the writing on it would be illegible when published.

PROPOSED PUBLIC PARK FOR TAUNTON.—An inquiry was held at Taunton on the 25th ult. by Col. Hasted, R.E., one of the inspectors of the Local Government Board, with reference to an application from the Town Council for permission to borrow 5,700*l.*, for the purpose of purchasing and laying out Vivary Park and adjacent land as a public park for the borough. The Borough Surveyor (Mr. J. H. Smith) produced the plans of the grounds, and gave an explanation of the way in which it was proposed to lay them out.

\* Small plans are reduced to the width of two columns, or 4 inches, for which the same proportion has to be observed in the original writing.

† It is amusing to find that when one has with difficulty persuaded a draughtsman that the writing of the names of rooms, &c., on a plan must be made large enough to bear reduction, still nothing will persuade him that the figuring of the scale will have to be treated in the same way. Frequently when we have obtained the re-writing of the names, the proper size, the plan comes back nevertheless with the numbering of the scale still in infinitesimal figures, as if it were under some separate influence, and would not be reduced like the other lettering.



## LETTER FROM PARIS.

The recent representations of "Œdipus" and "Antigone" in the Ronan theatre at Orange have drawn the attention of artists and archaeologists to this admirable specimen of Classic architecture. The success obtained by these performances, given by the chief artists of the Comédie Française before a select audience, have even suggested the idea of transforming the little town of Orange into a French Bayreuth, where, each year, by the help of a grant from the State, a certain number of classic plays might be performed.

The journals which have put forward this attractive idea have, at the same time, raised anew the question of the complete restoration of the theatre at Orange; it has even been asserted that M. Formigé, the architect, has been instructed by the Commission of Historic Monuments to work out for this purpose a complete scheme, and this, we believe, is correct. But up to the present no part of this scheme has been carried out. By a fortunate chance the portion of the monument which has suffered least from the ravages of time and man is the *scenæ*, properly so called, which from base to summit has been preserved intact. The wall against which it was planted, and the adjacent lateral constructions, which were called by the ancients the *Postscenium*, the *Proscenium*, and the *Parascenium*, still remain, as if by a miracle. On the other hand the semi-circular portion devoted to the audience has for some time been no more than a mass of ruins, and nothing remains of the stages of seats with the exception of the first rows, built on the rock. It is there alone that, up to the present, on account of the recent performances, M. Formigé has been obliged to take measures of precaution, consisting of the consolidation and repair of the banking by means of cement. It appears that with this his work may end, and that the Commission of Ancient Monuments is unwilling to assume the responsibility of more important operations, which, while they seem unnecessary, may even injuriously affect the integrity of the monument itself. The work that has been done should certainly suffice for a long time yet for the accommodation of the audiences coming each year from Paris and abroad to the plays which we may well wish to see periodically performed. The only adverse criticism which can be advanced is in reference to the numbering of the benches in large figures painted in red, a precaution possibly necessary for the public, but which produces a remarkable anachronism and a very disagreeable effect amidst the Roman environment as left by the Emperor Hadrian. Such is, at the present time, the state of affairs, and this explanation may, we trust, be sufficient to allay the fears which have been excited amongst archaeologists by the threatened carrying out of work on a much larger scale.

Whilst we are on archaeological topics, mention may be made of the interesting report which has just been presented by M. Homolle, Director of the French School at Athens, to the Académie des Inscriptions et Belles-lettres, on the present state of the excavations made at Delphi since the end of March, 1894. It appears from this document that three chambers have been opened under his direction—that of the Temple of Apollo, the Treasury of the Athenians, and the third in the neighbourhood of the wall called the "Hellenic," in the southern part of the sacred enclosure.

The upper terrace, on which the temple was raised, has been examined; the foundations of the monument have been discovered, and the underground galleries cleared. Briefly, the chief interest of these excavations lies in the discovery of a fine series of sculptures, photographs of which M. Homolle has sent to the Académie des Inscriptions et Belles-lettres.

Recent events in the extreme East lend an enhanced interest to the collection made by M. Varat, and just opened to the public in the Guimet Museum. This collection throws light on the curious manners and customs, costumes and creeds, of Corea. We may notice at the same time the re-opening of the Japanese Gallery in this beautiful museum, which has only one fault, that of being not sufficiently central and well known by the people of Paris.

At the Louvre Museum, pending the public exhibition of the magnificent collection given by the late M. Grandidier, there may already be seen the beautiful specimens of French pottery bequeathed by the late M. Girardeau de Nioris. Moreover, thanks to the curator, M. Molinier, the Ceramic museum of the Louvre has lately

undergone considerable improvements, and the former salon of Italian pottery has, by the addition of adjacent space, become an unique gallery of pottery of exceeding interest.

Once more there is an agitation, and this time strongly, for the reconstruction of the Luxembourg Museum, which, as it at present exists, is exceedingly unsuitable for the pictures, several canvases having suffered seriously from the atmospheric fluctuations of the rooms, alternately damp and over-heated. This state of affairs has for a long time been pointed out to the Minister of Public Works, but objection has always been taken to the expense, which would be considerable. It should have been mentioned that, with that love of half measures and dilatory expedients which characterises French administration, the orangery of the Luxembourg has already been allotted for the museum, displaced by the Senate from the galleries of the Palace; instead of which a new museum should have been built for the whole collection, large, well-lighted and well-ventilated. Now, if it were decided to replace the existing museum, it is to be feared that it would not be possible to entrench still further on the garden of the Luxembourg, which has, during the last twenty-nine years, been very much cut up, in order to construct an entire quarter of open streets, lay out small gardens, and build the Pharmaceutical and Clinical schools and a Lyceum. There is no lack of sites in the neighbourhood, where a satisfactory museum might be erected without further mutilating what used to be without exception the most beautiful garden in Paris. We must not leave the Luxembourg quarter without speaking of the monument which the sculptor Bariat has been commissioned to execute to the memory of Emile Augier, and which is to adorn the Place de l'Odéon. This monument will consist of a central stele of marble surmounted by a bronze bust of the celebrated writer, which will face towards the Rue de l'Odéon. On the steps forming the stylobate a muse in bronze, facing also to the Rue de l'Odéon, will be placed in the act of writing the name of the poet on the stele. Two other seated bronze figures will complete the decorative scheme; one of these, personifying Donna Clorinde, the heroine of "L'Aventurière," will look down the Rue Racine; the other, a boy holding masks, and symbolising the Genius of Comedy, will face towards the Rue de Condé. One of the masks is to recall the features of M. Got, the celebrated *doyen* of the Comédie Française, in the rôle of "Giboyer."

The Commission of Fine Arts of the Préfecture of the Seine has recently taken a step which meets with the unanimous approval of the Parisian press. It concerns the restoration of a mural painting of Eugène Delacroix, little known to the public, which adorns a gloomy chapel in the church of St. Denis du St. Sacrament, in the Rue de Turenne. This painting, a "Descent from the Cross," was lost in the obscurity of the south aisle, and had become invisible under a thick coating of smoke and dust. After commencing by lighting it by means of a bay window, the municipality directed M. Ch. Mercier, a clever restorer, to clean it, and thanks to his wise care, the masterpiece of Delacroix has regained all its beauty, and has become, though with a better lighting than before, what it was in 1843, when the celebrated painter was paid for it the price, then considered large, but now ridiculously small, of 6,000 francs.

It is as well to add that the same restorer is about to execute some important works in the church of Notre Dame de Lorette, where the decorations in the dome and chapels by Delorme, Perrin, and Orsel have almost completely vanished in consequence of the systematic hostility of the Municipality of Paris towards edifices dedicated to religious purposes. It is in consequence of this attitude of indifference to religion that one stands aghast at seeing that the beautiful stone groups which decorate the façade of La Trinité rear their headless and useless torsos on the four corners of the tower, and this notwithstanding that one of the groups has come from the chisel of the illustrious Carpeaux. It is likewise by reason of this culpable indifference that the decayed stones broken off from the capitals and columns of the Madeleine have been recently falling into the side aisles. Care for the public safety has obliged the diocesan architect to undertake the urgent repairs necessary to provide against serious accidents.

Several papers have recently noticed the speedy disappearance of the house where Meissonier lived at the corner of the Boulevard de Malesherbes and the Rue Legendre. Already

the pick of the housebreaker has commenced its work, and shortly nothing will be left of the well-known house where the great painter breathed his last no more than four years ago. It was Meissonier himself who drew the plans and designed all the details of the architecture; it was likewise he himself who superintended the carrying out of the work with that infinite care which he gave to everything. One cannot but regret the destruction of this charming example of Renaissance architecture, which, if it might not have been made a Meissonier Museum, ought at least to have fitted the taste of an amateur or an artist.

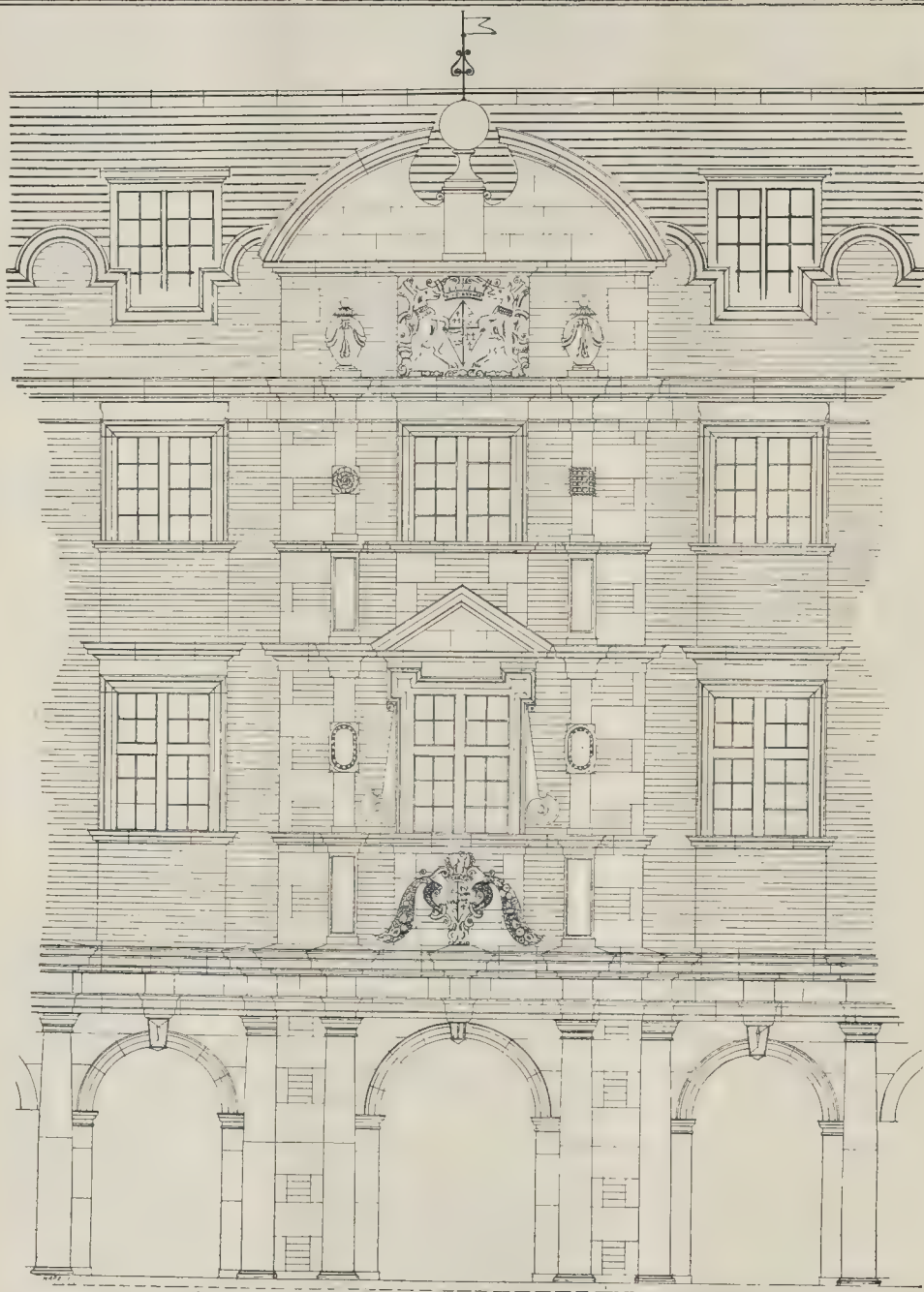
It is announced that the Minister of Fine Arts has entrusted to Coulon, the sculptor, a commission for a marble bust of the deceased architect Bailly. Two old friends and colleagues at the Institute of the regretted President of the Société des Artistes Français, MM. Jules Thomas and Charles Garnier, have been instructed by the Académie des Beaux-Arts to superintend the work in respect of execution and fidelity. Let us add that it is M. Thomas who is proposed by Ginani, the architect, to execute the bust of the Duchess de Galliera, which is to adorn the museum that she has presented to the town, and which is to be placed in the niche above the doorway of the principal vestibule.

In completing these items of art gossip, let us note what is rare at this time of year—the announcement of a competition for a large group of school buildings in the Rue des Boulets and Rue de la Roquette (XIIth Arrondissement), which is about to be erected, thanks to a bequest made to the city of Paris by the widow of Ledru-Rollin. This competition, starting on August 16, will close October 19 next.

At the Ecole des Beaux-Arts, the jury in architecture, presided over by M. Daumet, has just decided the annual competition in design, for which the subject was "A Museum of Zoology and Geology." Out of eighty-three designs exhibited first-class medals have been awarded to M. M. Huilbard (pupil of M. Laloux), and Melissent (pupil of M. Raulin). M. M. Butler (pupil of M. Laloux), Jaussey (pupil of M. Esquie), Albrespic (pupil of M. Guadet), and Nolle (pupil of M. Bernier), have received second-class medals. The jury has also awarded four third-class medals and fifty-nine honourable mentions.

The death of the animal sculptor, Auguste Cain, has already been announced in the *Builder*. We may now supplement this news by some biographical details of the lamented artist who died at the age of seventy-two years. M. Cain was a pure bred Parisian, and passed his youth in hard and meritorious labour. The son of a soldier of the first empire, he was early obliged to earn his bread by making ornamental furniture in the workshop of M. Guilbonnet. At odd times he studied modelling and sculpture at the studio of Rude, who had taken a fancy to him. Subsequently he went through the course of instruction which Barye gave at the Museum of Natural History, and the latter was much interested by the efforts of his young pupil, who had already made a speciality of the small animal groups of which he himself was the originator. Becoming in 1852 the son-in-law of the sculptor, Mène, they were associated together in the sale of their joint works. It was in 1846 that he exhibited for the first time, and after that he never lacked success. We may note among his principal works, which are attractively picturesque, even though too theatrical in taste and possessing less reserve and power than those of Barye, a Lioness of the Sahara (1864), Tiger and Crocodile (1869), Lion and Lioness Fighting over a Boar (1879), Lion in Ambush (Garden of the Luxembourg), Tiger attacking a Crocodile and Rhinoceros attacked by Tigers (Garden of the Tuilleries), Pack of Dogs (Château de Chantilly), Bull in the Cascade of the Trocadero, Seated Lions at the Doors of the Hotel de Ville, Paris, and, finally, his last work which he has bequeathed to his native town—"Eagle and Vultures Fighting over the Carcase of a Bear."

M. Cain, who left two sons, both painters, Georges and Henri Cain, received medals at the Salons of 1851, 1863, 1864, 1867, was decorated in 1869; again received a medal at the International Exhibition of 1878, and was promoted to be an officer of the Legion of Honour in 1882. Still in full possession of his powers, young in appearance and manners, he was well-known in the Parisian world for his dauntless vivacity and sympathetic character. Quite recently he took part in the inauguration of the monument to Barye, and energetically applauded the tributes rendered by the various speakers to his former



Part of Elevation of South Side of Third Court, St. John's College, Cambridge. Measured and Drawn by Mr. H. V. Ashley.

master. He was already stricken with the germs of the fatal disease which some days after snatched him from the affection of his family, the high esteem of his friends, and the admiration of those who appreciated his genius.

METHODIST CHAPEL, CORK.—On the 23rd ult. the foundation-stone was laid of a new Methodist chapel at Barrackton, Cork. The architect is Mr. R. Walker.

#### ST. JOHN'S COLLEGE, CAMBRIDGE.

This is a measured drawing of the gateway in the centre of the west side of the third court of St. John's College, leading through the cloister over the so-called Bridge of Sighs to the fourth court. The foundations were laid in 1669, by which time the Gothic style had given way to the

Classic revival. It is evident, however, that some attempt has been made to assimilate the new building with the old Gothic Library on the north side of this court, and no want of harmony is perceptible.

In general outline it resembles the entrance to Clare Quadrangle from the river. There are six bays on each side of the entrance.



## A MORNING IN CONWAY.

PROBABLY few of those who pass through a corner of the little town of Conway on their way to the mountains of Wales or the seaside resorts which are dotted along the shores at the feet of the giants which lead up to Snowdon, are aware of the quaintness of the place they are passing. They may, perhaps, be attracted for a moment by the ancient stone towers which rear themselves out of sight from the carriage windows, and by the considerable length of embattled wall which flanks the railway for a minute or two as the train draws up to the station; but unless they actually alight and visit the place they will never realise that in one respect it is almost, if not quite, unique among English towns, namely, in being still surrounded with its ancient walls, so that from the towers of the castle, which occupies a relatively large space in one corner, its whole extent can be seen at a glance as clearly defined as at any period of its history. This is a very unusual occurrence in England, and one expects that in order to gain so clear an idea of a Mediaeval town one must seek the remoter districts of France or Germany; but here at Conway, close to much-frequented watering-places, the same experience can be gained in a morning's outing.

The castle, of course, is the principal feature, and its main walls are well preserved, but all the delicate wrought work has suffered, and the remains of the window tracery would hardly afford sufficient clue for the most practised restorer. There are a few stone hoods of fireplaces left, and there is a quaint little so-called oratory in the Queen's Tower, a little vaulted recess in the thickness of the wall; but these comprise all the features of particular interest. The great Hall, called Llewellyn's, is curious in that it is not straight on plan, but slightly curved in its length, following the line of the outer wall of the castle, an arrangement dictated by necessity, and one that must have greatly detracted from its architectural appearance. The roof was carried on stone arches which spanned its width, possibly with a view to cut the roof up into a number of straight lengths; although the opposite view is also held—namely, that the inner wall of the hall was purposely built curved in order to be better able to resist the thrust of the arches. For the rest, there are the usual deeply embrasured windows or loopholes with stone seats on either side, the usual puzzling passages, and the lofty cylinders studded with the remains of the spiral staircases; the usual stale smells, and wondering tourists and amateur photographers. Here, too, as usual, visitors are compelled to get from one part to another in a haphazard way, regardless of doorways and of the ancient routes of traffic. With a little trouble the original doorway might be made to serve their proper purpose; and instead of being sent from one level to another up modern steps which are a mutilation of the old work, surely in such places it might be arranged, to the great advantage of the visitor who cares to see beyond the ivy and ferns, that he should first of all enter them by an ancient gateway instead of a window or a breach in the wall, and when once in that he should make his tour of inspection along lines which the ancient inhabitants themselves could have followed, instead of having to go through all sorts of fortuitous gaps, which bring him to utter confusion so far as any intelligible notion of the plan is concerned.

From the summit of the walls, and the one tower which is now accessible, an excellent idea of the town and its situation can be gained. One side of it lies along the river Conway, and the castle is in the corner of that side, commanding the ford over the river. On to the river bank, or quay, three gates lead, one near the castle, one half-way along the wall, and one at the extreme end, so that access from the waterside was tolerably easy. Opposite the middle gate, across the narrow width of the town, is another gate leading out to the wild and mountainous country west of the river. Somewhere about the middle of the town stands the church, a restored building of the fourteenth century, and beyond it the well-known Plas Mawr, or Great House.

To many people this will be the most interesting building in Conway, it is so well preserved and carefully kept. As an example of Elizabethan architecture it probably has no rival in Wales. Of the workmanship too much need not be said. There is a good deal of stonework, woodwork, and, especially, plasterwork, but the execution is all somewhat rude—as, indeed, might be expected in a remote country like Wales. But the plan of the house is exceedingly interesting, and so, too, are the numerous heraldic badges and coats-of-arms which abound in the plasterwork. The

house stands on a site at the corner of two streets; there is a short side towards a fairly broad and level street, and a long side towards a narrow and steep lane. The house itself is of a usual type of plan, having two wings connected by the body, the wings and a central porch projecting slightly on the front. This front lies back from the broader street and along the narrow and steep lane, with the result that the central porch is not easy of access, both on account of the narrowness and the steepness of the lane; accordingly, we find that it does not seem to have been the chief entrance—that is, it does not lead to the hall through the screens in the usual fashion, but to the kitchen and servants' department. In order to gain a suitable entrance for the family, a sort of gatehouse with rooms over it was built facing the broader street, and separated from the house itself by a courtyard. But, from the steepness of the site, the entrance through the gatehouse is considerably lower than the floor of the house itself, and, accordingly, from the court a flight of steps leads on to a narrow terrace that runs the length of the wing of the house, and from the terrace the hall is entered. This occupies a large part of the wing, instead of (as usual) the space between the two wings. The arrangement is curious, and evidently dictated by the exigencies of the site; and the little courtyard, with the steps and terrace, gives a very quaint and unusual flavour. Inside, the house has several rooms with ornamental ceilings and fireplaces; the former are simple in design and somewhat ill-modelled, the latter belong to the more extravagant and less well-digested types of chimney-piece. Everywhere inside occur heraldic emblems. The age, of course, delighted in such things, and as a Welshman, as a rule, could produce many more ancestors than an Englishman, he had a corresponding advantage when he came to decorate his house. The Robert Wynne who built this house derived his descent from no less ancient and respectable a person than Caractacus; and though the arms of that worthy are rather far to seek, still Robert Wynne drew upon the arms of a good many of his intermediate ancestors for the purpose of decorating his house. His wife, Dorothy, was the daughter of Sir William Griffith, of Penhryn, whose pedigree did not apparently start from so remote and exalted a source as Robert Wynne's, nevertheless, it was sufficiently extended to afford from its blazonry a fair number of badges and devices wherewith to embellish the walls and ceilings.

Altogether, the house is well worth seeing. It has fortunately escaped the destruction which usually follows such vicissitudes as this has experienced (having been cut up into various tenements); it has been very carefully reinstated—to say "restored" would perhaps convey an unduly unfavourable impression; and it is very carefully looked after by its present tenants, the Royal Cambrian Academy of Arts. A stroll through its rooms, with the guidance of the plans published in the monograph by Messrs. Arthur & Herbert Baker, will be found an agreeable way of spending an hour.

## ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS:

## VISIT TO BELGIUM.

THE members of the Incorporated Association of Municipal and County Engineers last week paid a visit to Belgium for the purpose of studying Continental methods of sanitation, and inspecting the various municipal engineering works. The visit was arranged with a view of enabling the members of the Association to compare notes with Belgian engineers on sanitation, and the large numbers of members who availed themselves of the opportunity of attending showed the very great interest taken in the meeting by municipal engineers and by the municipal authorities which they represent. The members who were present were—Messrs. A. M. Fowler, Manchester, President; C. H. Lowe, Hampstead; J. Parker, Nottingham; Hopkins, London County Council; J. Parker, jun., Nottingham; G. F. Carter, Hewsom; E. B. Martin Frankland; J. Richardson; C. Brownridge, F. S. Button, Burnley; R. Godfrey, King's Norton; J. T. Eays, West Bromwich; C. G. Lawson, Southgate; W. Fairley, Mortlake; H. W. Stringfellow, Chichester; J. A. Barber, Streatham; W. Tanner, Monmouth; F. W. Lacey, Bournemouth; W. Weaver, Kensington; G. J. Shepherd, Kidderminster; H. Goodyear, Colchester; J. Price, Toxteth Park, Liverpool; J. C. Pardoe; T. H. N. Park, Walsall; W. H. Savage, East Ham;

W. H. Smith, Carlisle; W. E. Baker, Nottingham; F. Massie, Wakefield; J. Lobley, Ilanley; A. H. Claypole; C. Mayne, Shanghai; S. Stead, Harrogate; J. W. Wardle, Longton; J. H. Bradley; R. W. Thomas, Buckingham; A. Salmon, Wallasey; J. Paton, Plymouth; G. H. Lynam, Aberdeen; A. Creer, York; J. L. Hodge, Plymouth; W. H. Leete, Bedford; T. B. Farrington, R. Hughes, Rhyl; W. G. Penty, York; J. E. Parry; E. Jeeves, Melton Mowbray; C. C. Hooley, Barton-upon-Irwell, Patricroft; C. W. Ward; J. Clare, Sleaford; E. J. Harvey, Ventnor; and J. W. Cockrill, Great Yarmouth. The visitors included Mr. and Mrs. Fullalove, Burnley; Mrs. Button, Burnley; Devonport; E. G. R. Richards; Mr. Bainbridge; C. Mayne; F. Mayne; G. Law, junr., Kidderminster; A. Law, Kidderminster; H. Williams; Mr. Benham, Colchester; Councillor W. Beck, Colchester; T. A. Bayliss; J. Harris; and H. R. Wilkinson.

The inspection of public works was begun on Friday morning, August 17, under the guidance of M. Putseys, City Engineer of Brussels. A visit was first paid to the General Collectors and the Senne, and in a specially-built carriage the members were taken through the sewer from the *Ecluse du Midi* to the Bourse—a distance of more than half-a-mile. The sewer, which is of concrete, is a splendid piece of workmanship, and of great capacity. The main sewers run through the city on either side of the river, and are so arranged that, in the event of exceptional demands upon the sewer from storms or other causes, the river will act as an outfall. As a result, the sewers cope with exceptional demands upon their capacity with great ease, but at the expense of very serious pollution of the stream by the mixture of crude sewage with the river. The greater volume of the sewage is not carried through the overflow, and is discharged into the Scheldt below Malines. The system apparently works successfully, as is evidenced by the fact that the party travelled for nearly a mile through the sewers, which are comparatively free from sewer-gases; but the obvious defect is the outlet into the river at times of heavy storms. From the sewers a visit was paid to the Brussels Municipal Electric Light Station, which has been constructed and is being worked by the India-rubber Gutta-Percha and Telegraph Works Company, Limited, Silvertown, London. The system selected by the Municipality is the three-wire low-pressure distribution method worked in conjunction with accumulators, and the India-Rubber Company are responsible for two years' working of the system. The works were designed by Mr. Stuart A. Russell, resident engineer, and have now been working for eight months with complete success. The buildings include a boiler and machine-room on the ground floor, and on the first-floor a battery-room, repairing-shop, and stores over the machine-room, whilst the coal-store, water-purifiers, and tanks are placed over the boiler-room. An electric lift has been constructed to convey the fuel to the coal-store. The present plant consists of three Babcock & Wilcox boilers; each has a heating-surface of 2,440 square feet, and is capable of evaporating 7,500 lbs. of water per hour. The machine-room contains the engines, dynamos, and switchboard, and is fitted with an overhead traveller. Each engine drives two dynamos, which are of the four-pole type, shunt wound, with drum armature running at 300 to 350 revolutions per minute, with an output of 145 kilowatts as the normal full load, but capable of working up to 180 kilowatts for a continuous run of twelve hours, without overheating or sparking at the brushes. It is interesting to note that this is the first large central station worked on the low-tension system in which the method of distribution has been entirely carried out with india-rubber insulated cables. The demand for the light is increasing, and it is believed that with the reduction in the price per unit which has recently taken place the use of the light will be very rapidly increased this winter.

A visit was afterwards made to the Ferme des Boues, where the dust-destructors were inspected. The installation of incineration-furnaces is fairly well up-to-date, both in point of construction and method of working, but on very similar lines to destructors in use in England. In the afternoon a visit was paid to the Gas-works, which are also the property of and worked by the Municipality of Brussels. The retort-settings are entirely on the horizontal system, and labour-saving appliances are not nearly so largely in use as at the Gas Light and Coke Company's station at Beekton, or the South Metropolitan Company's Works at Greenwich.



In the purifying-houses were a number of children suffering from whooping-cough, and it appears that children suffering from this disease are regularly allowed admission to the works. On Friday evening the members of the Association were entertained at a reception by the Burgomaster and the College of Burgomasters at the Hôtel de Ville, many of the leading citizens of Brussels also accepting invitations to meet the Association. The Burgomaster (M. Bulh) extended a very hearty welcome to the Association, and spoke in high terms of the services rendered to sanitation and health by the work of the Municipal Engineers. Mr. A. M. Fowler, President, acknowledged the kindly welcome given to the Association by the municipal authorities of Brussels, and reciprocated the good wishes expressed towards England by the Burgomaster.

On Saturday morning, August 18, the various kinds of paving used in Brussels—porphyry, sandstone, wood, asphalt, and macadam—were inspected; and subsequently visits were made to the underground chamber—25 mètres below ground—for the gauging of the water for alimentary purposes. In the afternoon visits were made to the college in the Rue Haute, for the purpose of inspecting the methods of heating and ventilation, and to the Palais de Justice, where the arrangements of the Courts and the accommodation provided for the administration of justice were much admired. On Monday, August 20, a visit was paid to Malines for the purpose of visiting the Antwerp waterworks and filter-beds. The members of the Association were met at the Waterworks by Professor Lemayr, analytical chemist, who explained the methods adopted for the purification of the water, which is a work of much difficulty, as portion of the supply drawn from deep wells is impregnated with peat, and the remaining portion of the water, drawn from the Scheldt, is polluted with Brussels sewage, from the tidal action of the river. On Tuesday visits were made to the Antwerp Exhibition. The meeting was throughout a complete success, and the knowledge gained by members of Continental methods of sanitation and water-supply must prove of very great value to the municipalities which they represent in this country.

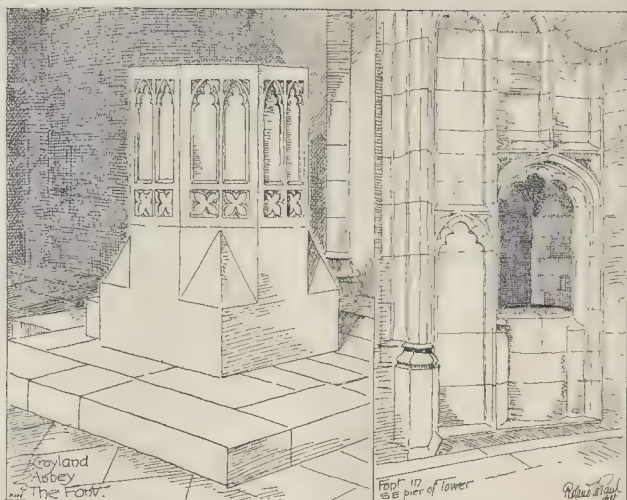
### Illustrations.

#### CROYLAND ABBEY.\*

THE great Benedictine mitred Abbey of Croyland, or Crowland, was originally founded in 716 by King Ethelbald, in fulfilment of a promise made to St. Guthlac in the event of a prophecy that the Crown of Mercia should be his being realised. The Abbey thus founded was built on piles driven into the peat, and existed until 870, when it was burnt by the Danes. It was restored by Abbot Thurkytel in 1051, and rebuilt by Abbot Ulketyl in 1051, but suffered again by fire thirty years afterwards, during the abbacy of Ingulphus, the famous writer of the "Chronicles." On March 13, 1113, Abbot Joffrid, or Geoffrey, laid the foundations of the choir of a new church, but this was considerably damaged by an earthquake in the following year, and by a fire in 1143. Perpendicular times saw the entire remodelling of the nave and the rebuilding of the north aisle and the great north-west tower. After the Dissolution in 1539, the eastern arm and the transepts were pulled down; and its vicissitudes included a siege by Cromwell in 1643, and the removal of many of its stones to Spalding after a great fire there in 1712. The nave roof fell in 1720, and in 1744 the south wall of the south aisle was taken down to build buttresses for the tower and the west end of the Abbey. The existing remains of the Abbey Church consist of the ruins of the nave and west front, a north aisle still retaining its vaulting, and used as the parish church, with a massive tower at its west end, the western wall of which is flush, or nearly so, with the façade of the church. Sufficient traces exist of the Norman nave to show its main dimensions. The west end of the south aisle is Norman and arcaded throughout, being pierced only by a small window with a deep inner spire. The angle pilaster buttress has now gone, but old

\* The series of the "Abbeys of Great Britain" is continued this month with illustrations of (No. IV.) "Croyland." (No. I.) "Westminster" was given in our New Year's number, January 6, 1894. (Nos. II. and III.) "Rievaulx" and "Glastonbury" were given in the Builder for July 7 and August 4 respectively. Particulars of this and of the three Cathedral series ("England and Wales," "Scotland," and "Ireland") will be found on p. 162.

† The historical dates here given are taken from a pamphlet published by the Rector of Croyland.



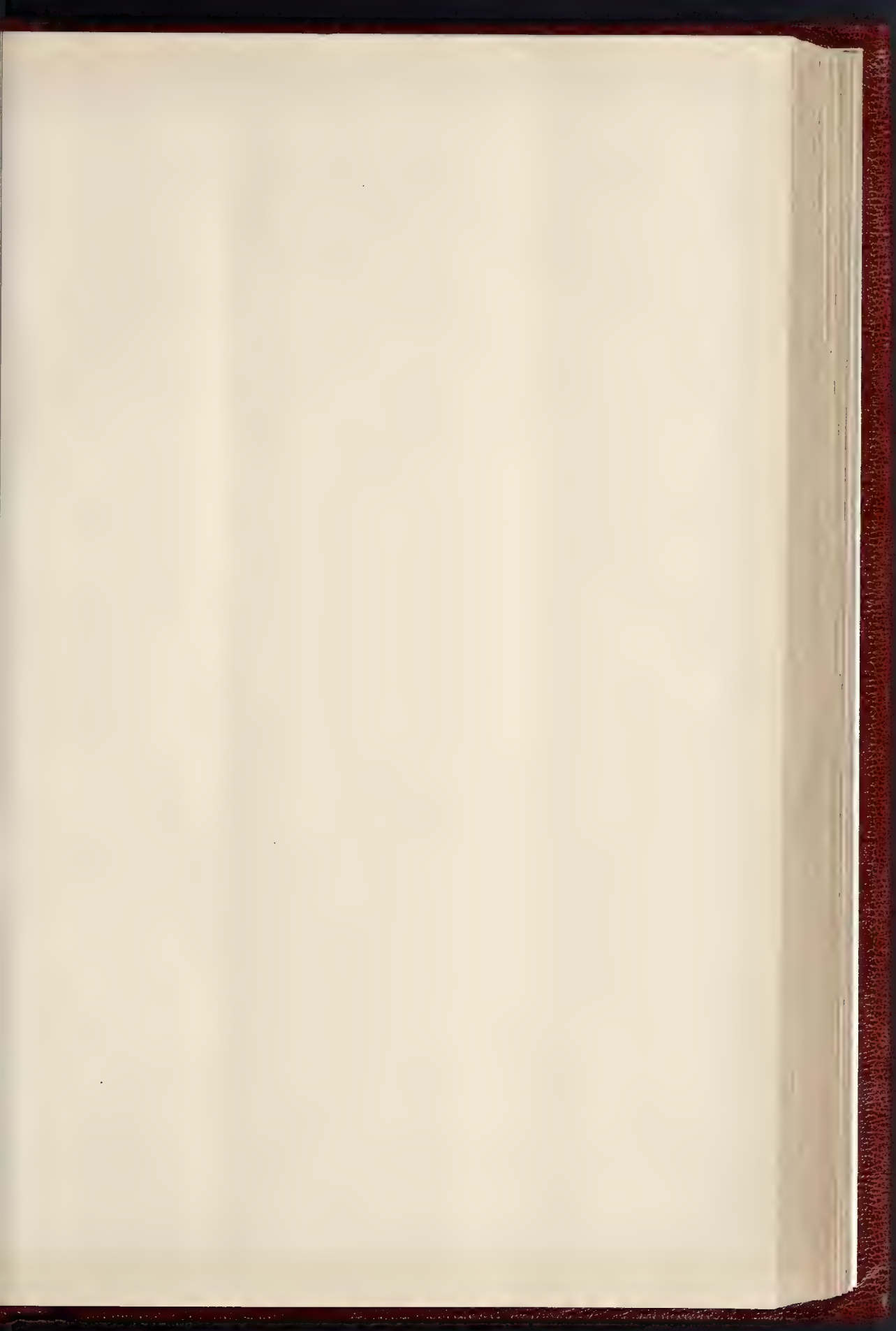
prints show it to have been of a usual type, and about 6 ft. on each face west and south, which would make the aisle about 10 ft. in width, inside measurement. The arcades of the nave are represented only by the eastern responds near the western tower arch, and an interesting fragment of the western respond of the north arcade, which was discovered during the repairs to the tower, and left exposed. A portion, also, of a doorway, a little to the right on entering the present western door under the tower, and one or two evidences of the design at the west being slightly different to that at the east, would seem to point to the existence of a large tower at the western end of the north aisle, of the same importance to the Norman building as the present one bears to the Perpendicular church. These remains also show that the later arcades, when rebuilt by Abbot Overton in the fifteenth century, followed pretty closely the lines of the Norman church. Of the central tower the western arch with its abutments alone remains, and is carried on corbels supported by semi-circular wall-shafts, which bear many evidences of having been inserted at a later period. The whole of this portion of the ruins is in truth a patchwork, and there is some difficulty in discerning the original meaning of some of its features. The Norman arcade had a triforium gallery over it, and what must have been a small clearstory finished the design. In the Perpendicular remodelling, however, the arcade was heightened to the level of the top of the Norman triforium, and above was a clearstory and triforium wall combined, under one arch. The windows themselves were of four lights. This is all plainly seen on the north side, and old engravings give roughly the traces of the clearstory windows. The only Early English and Decorated work is to be found in the west front, and is of very beautiful design. Perhaps no better example could be found of the cleverness of the Medieval builders in carrying out the spirit of a design through successive styles. It is, in fact, of three dates. The lower portion—a double doorway, under a richly-moulded enclosing arch, flanked by a trefoil-headed recess on either side—is Early English. Above this, to the springing of the great west window, the design is more Decorated in style, while the rest of the front above this level, and the great western window itself, are Perpendicular. The whole is richly embellished with sculpture. Scenes from the life of St. Guthlac fill the quatrefoil in the tympanum of the doorway, and in the side recesses were four statues of the Evangelists. Only a portion of the figure of St. John remains, and headless. Above this (in the Decorated portion) are figures of an Abbot, William I. and his Queen, Ingulphus, the historian of the Abbey, Archbishop Langfranc, King Wiltar, Waltheof, Earl of Northumberland, and Abbot Joffrid, the rebuilder of the choir. In the gable was our Lord in Majesty—now to be seen on the triangular bridge in the town—doubtless, by figures, and below, in the Perpendicular portion, were fourteen canopied niches, of which eleven remain, containing in the upper tier the Apostles,

and below King Ethelbald, the first founder, King Richard II., the refounder, and St. Bartholomew and Guthlac, to whom, with the Virgin, the church was dedicated. This magnificent front was at one time in great danger of falling, and in 1860 it was placed in the hands of Sir Gilbert Scott, who, by means of powerful screw-jacks, once more brought the walls into a vertical position. The jambs of the west window are still considerably distorted, being much further apart at the springing than at the cill level, but in all respects the front may be now said to be secured from any immediate danger. Immediately to the north, and masking the north aisle of the nave, stands the great tower, doubtless a successor to an earlier and smaller building of the same kind, and now used as a belfry, although at present it is not considered safe to swing the bells. The larger portion of the west and east walls are taken up by a large Perpendicular window of six lights. That on the west has been glazed, and lights the interior of the tower, which is ceiled at the level of the string over the window. The corresponding window on the east side still remains blocked. Above is a low belfry stage, the whole being capped by a low stone spire. At the angles of the tower are lofty panelled buttresses, having considerable projection. On the north side are two other buttresses of later date for strengthening the tower on that side.

Projecting from the west face is a porch of two bays, Late Perpendicular in style, and at one time vaulted. The wall shafts and springers, however, only remain. Over is a room, now approached by a modern staircase built by the present rector, in the chamber on the left of the porch on entering (at one time the parish mortuary), and also by stairs branching from the tower stairs in its N.W. angle. This upper room has now been fitted up as a small chapel. The exterior of the north aisle is in a much dilapidated state, and has been heavily buttressed to counteract the thrust of the wall. The aisle is six bays in length, the westernmost three having chapels projecting from the north side. The present East







# DOMINION CATHEDRAL

DESIGNED BY THE ARCHITECTS  
JOHN R. COOPER & SONS

10, BROADWAY, N.Y.



1894





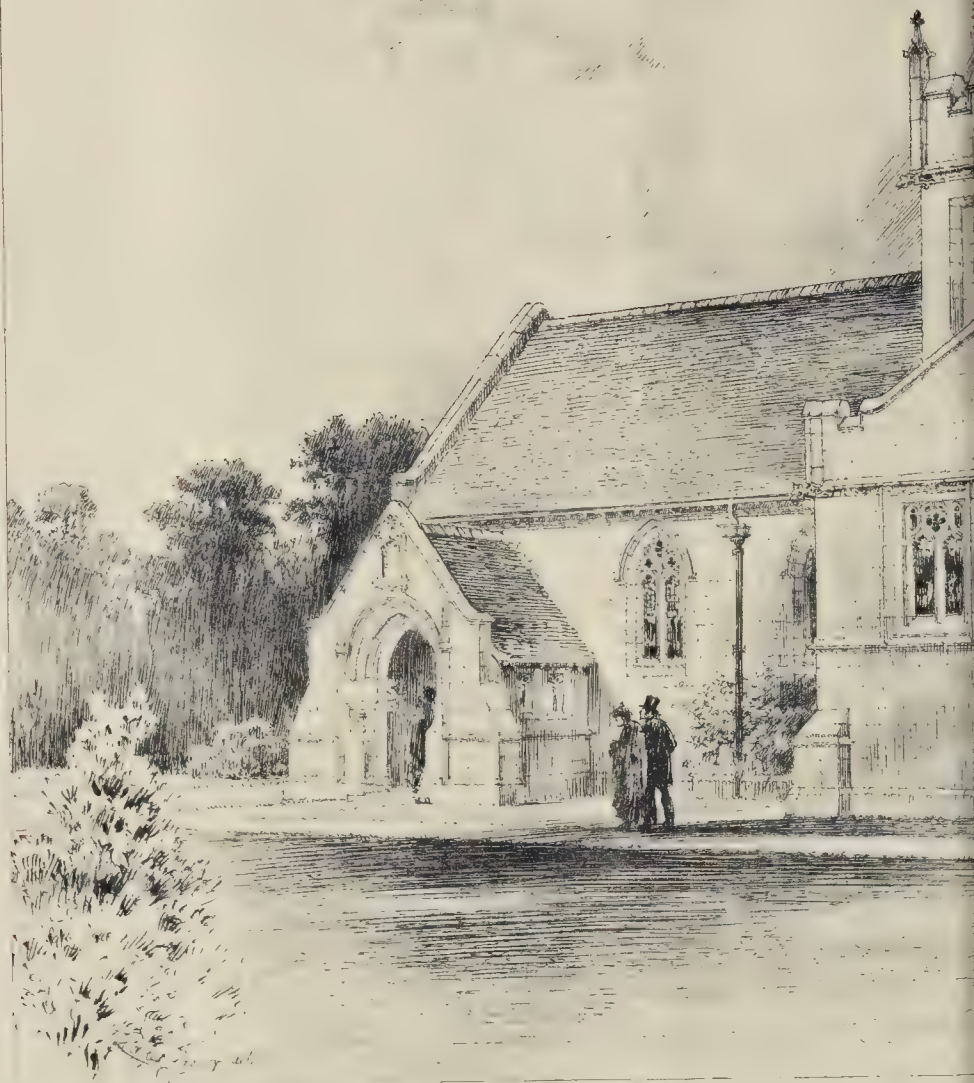
Royal Academy Exhibition, 1891





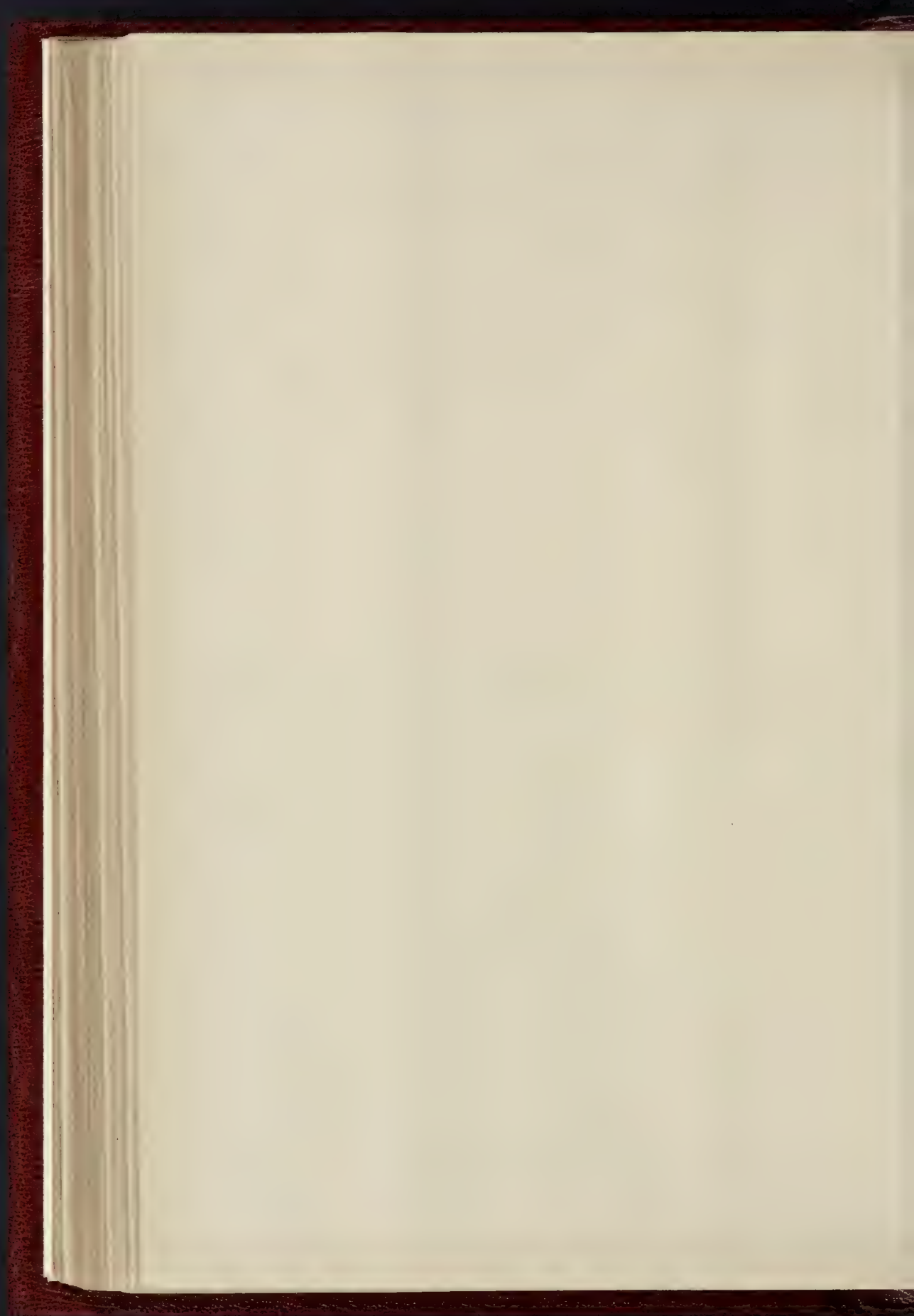


## Slindon Church Staffs.

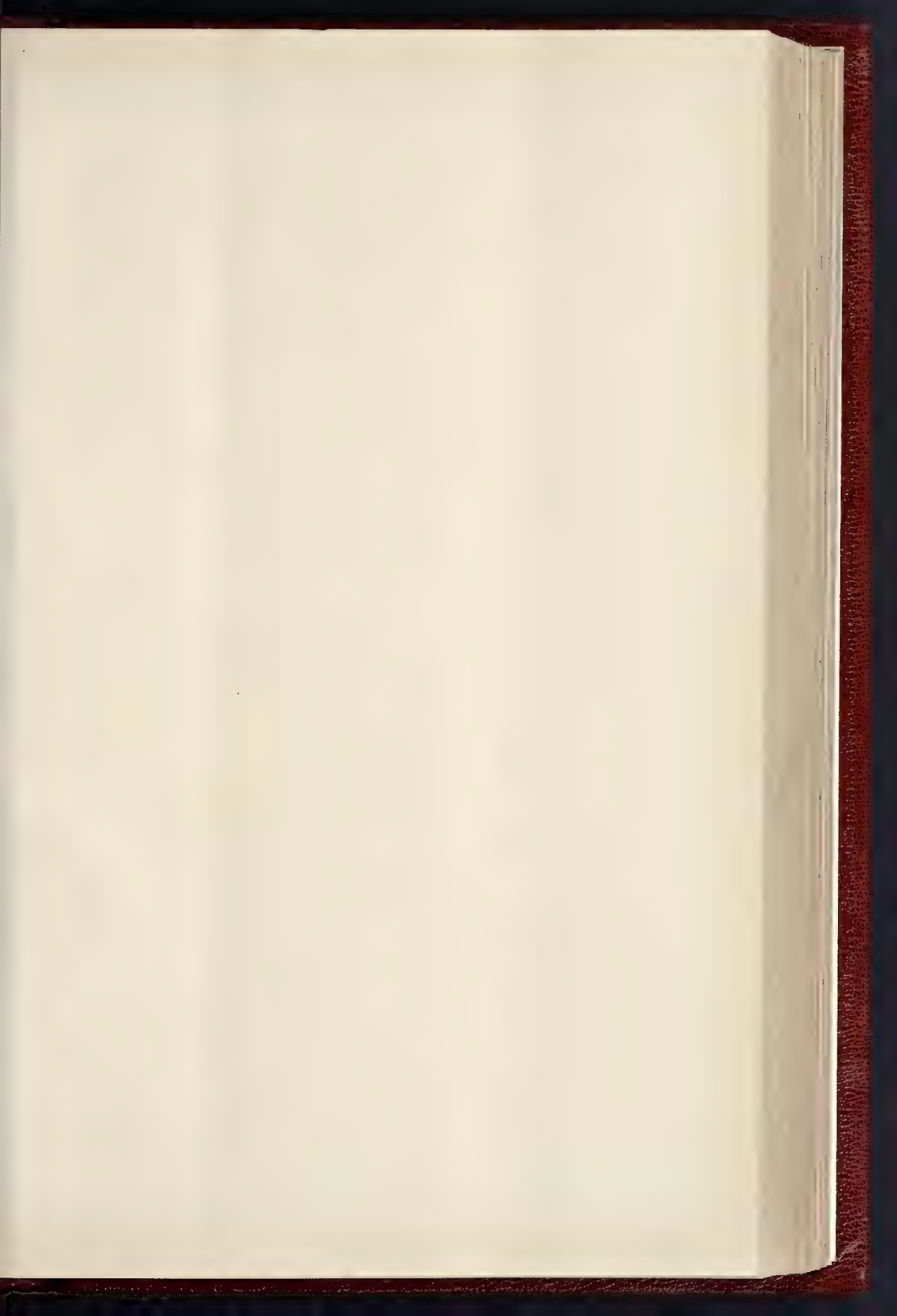
Hasil Hampneys R.A.  
Architect



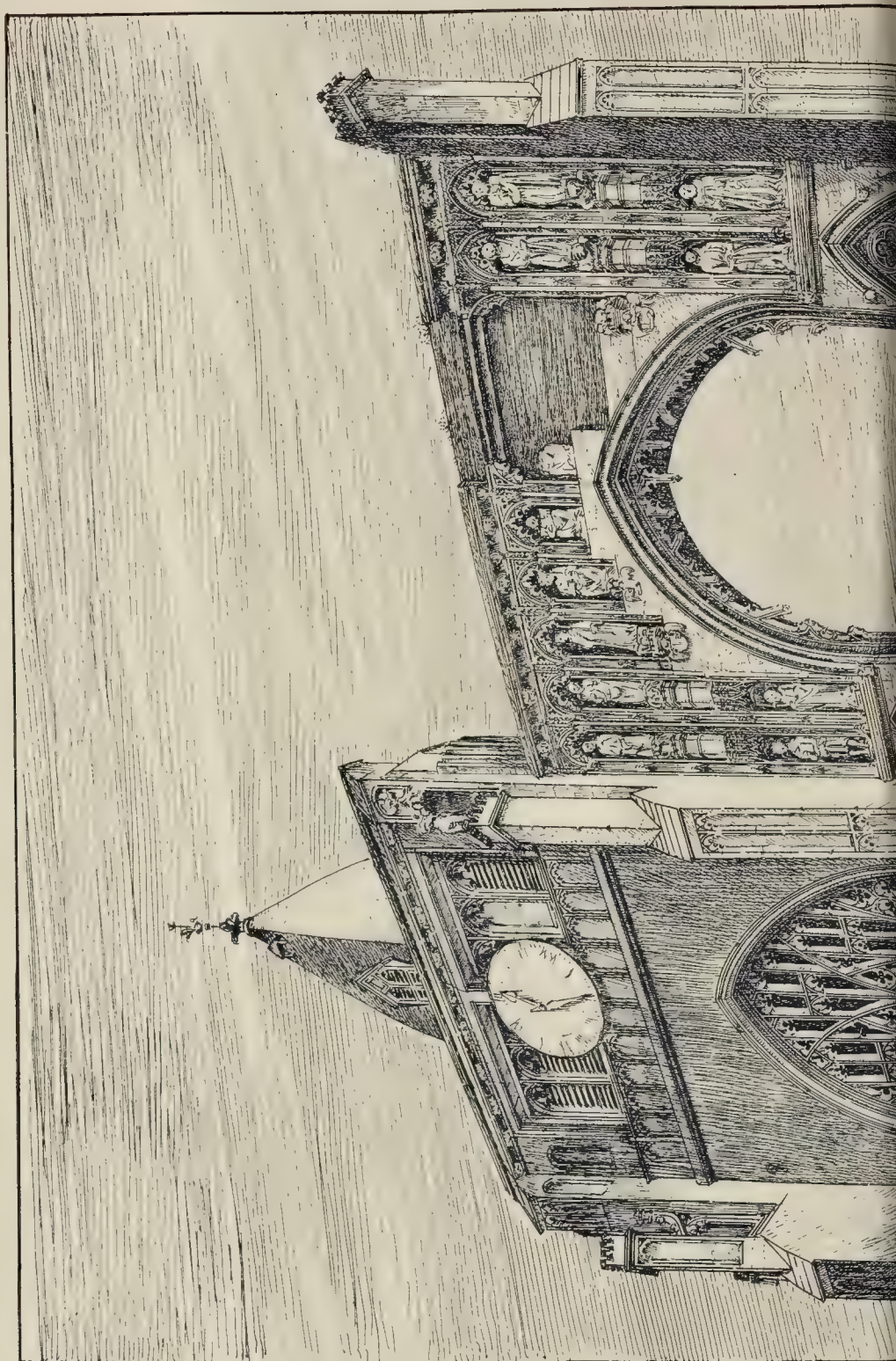








THE BUILDER, SEPTEMBER 1, 1894





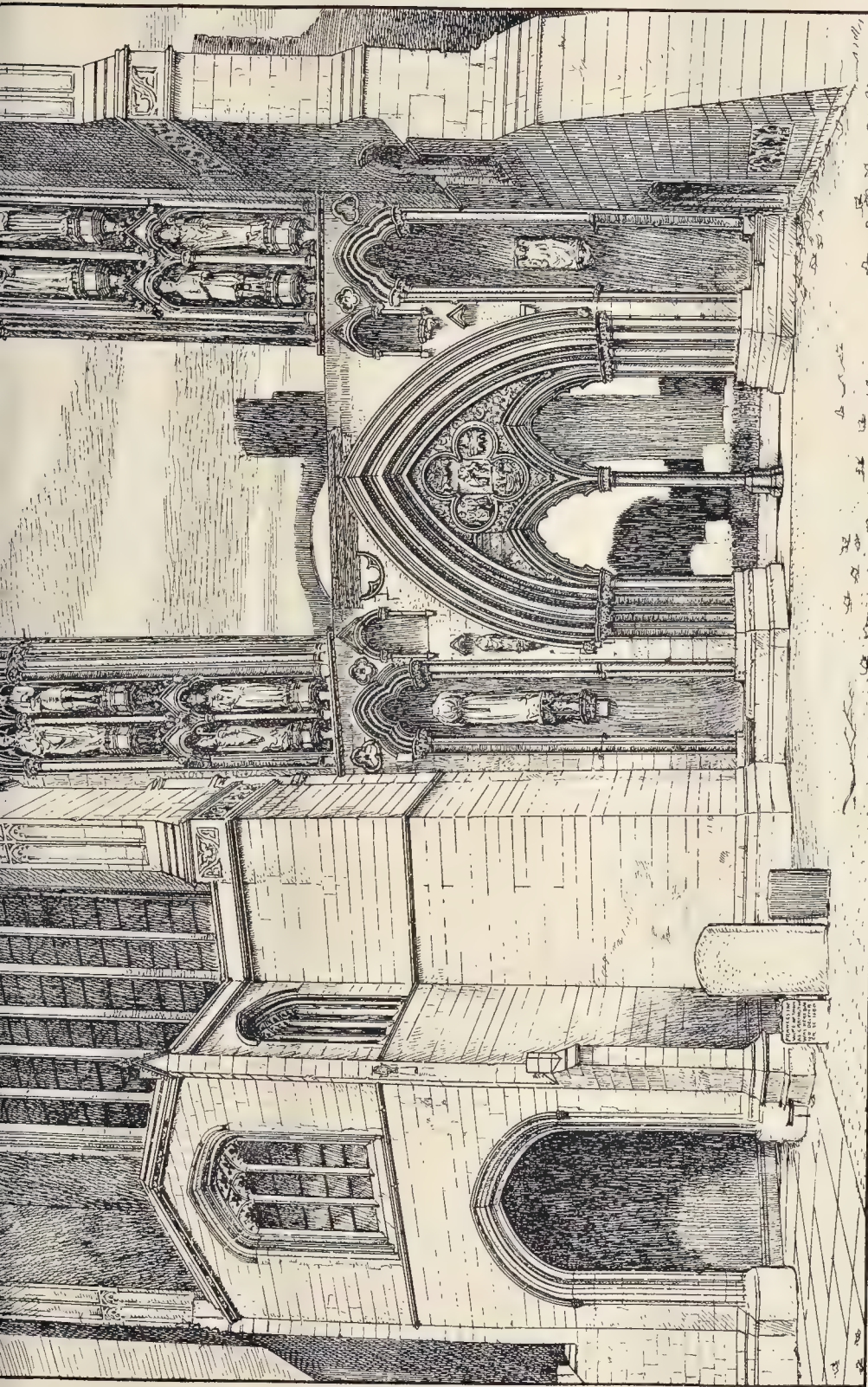
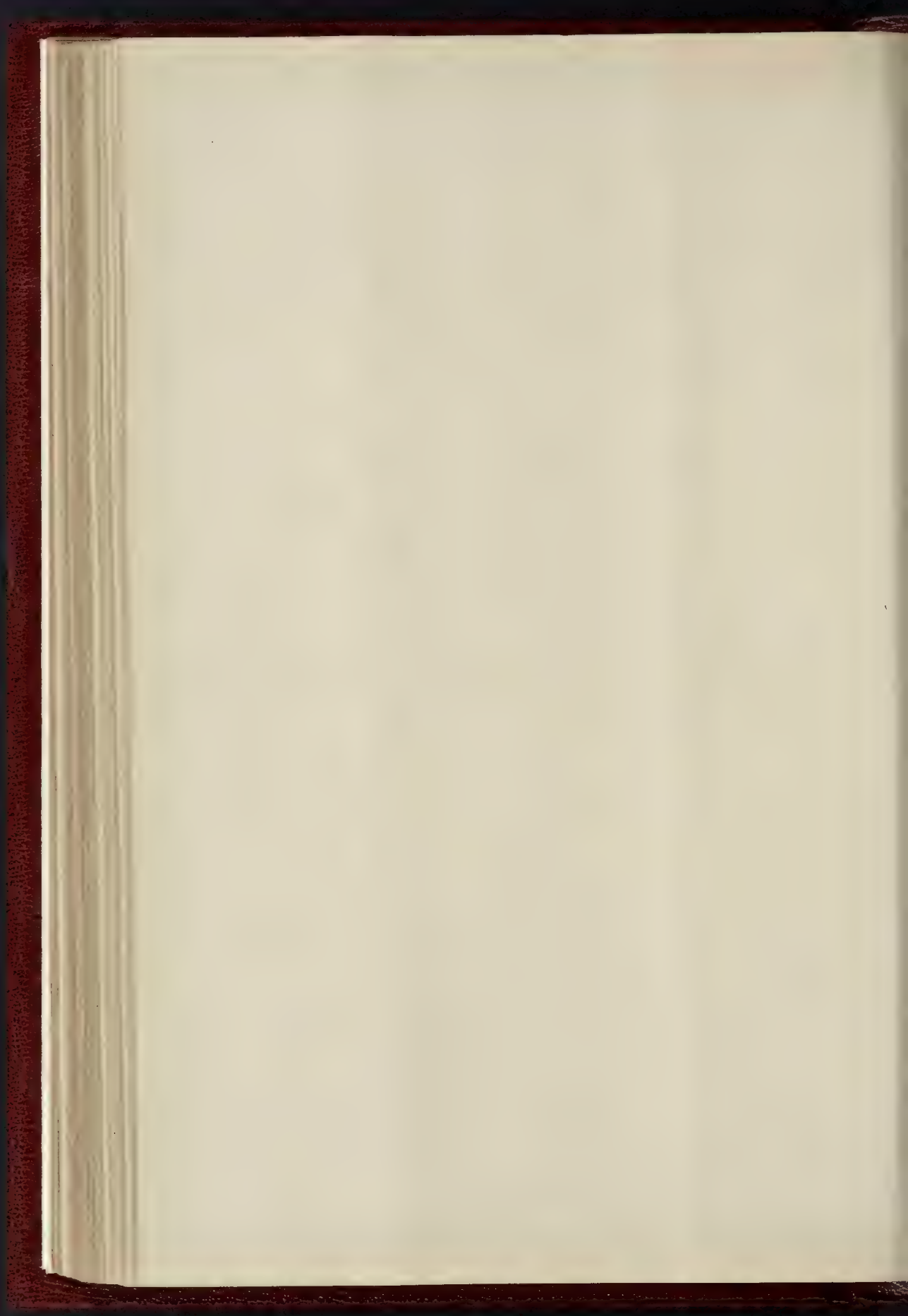


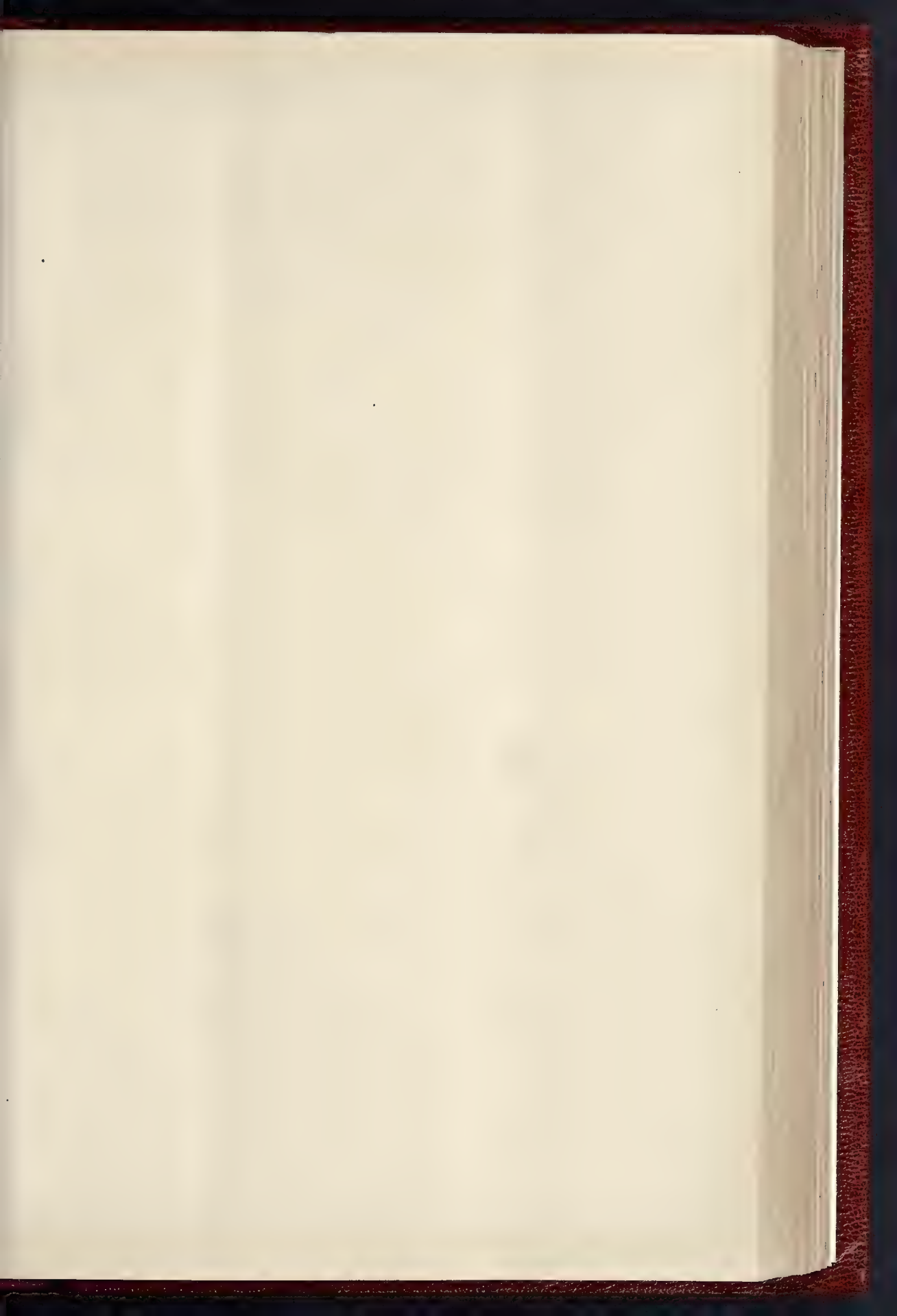
PHOTO LITHO SPRAGUE & CO. 42, EAST HADSON STREET, NEW YORK

THE ABBEYS OF GREAT BRITAIN.—No. 4. CROYLAND.

DRAWN BY MR W R LETHBRIDGE

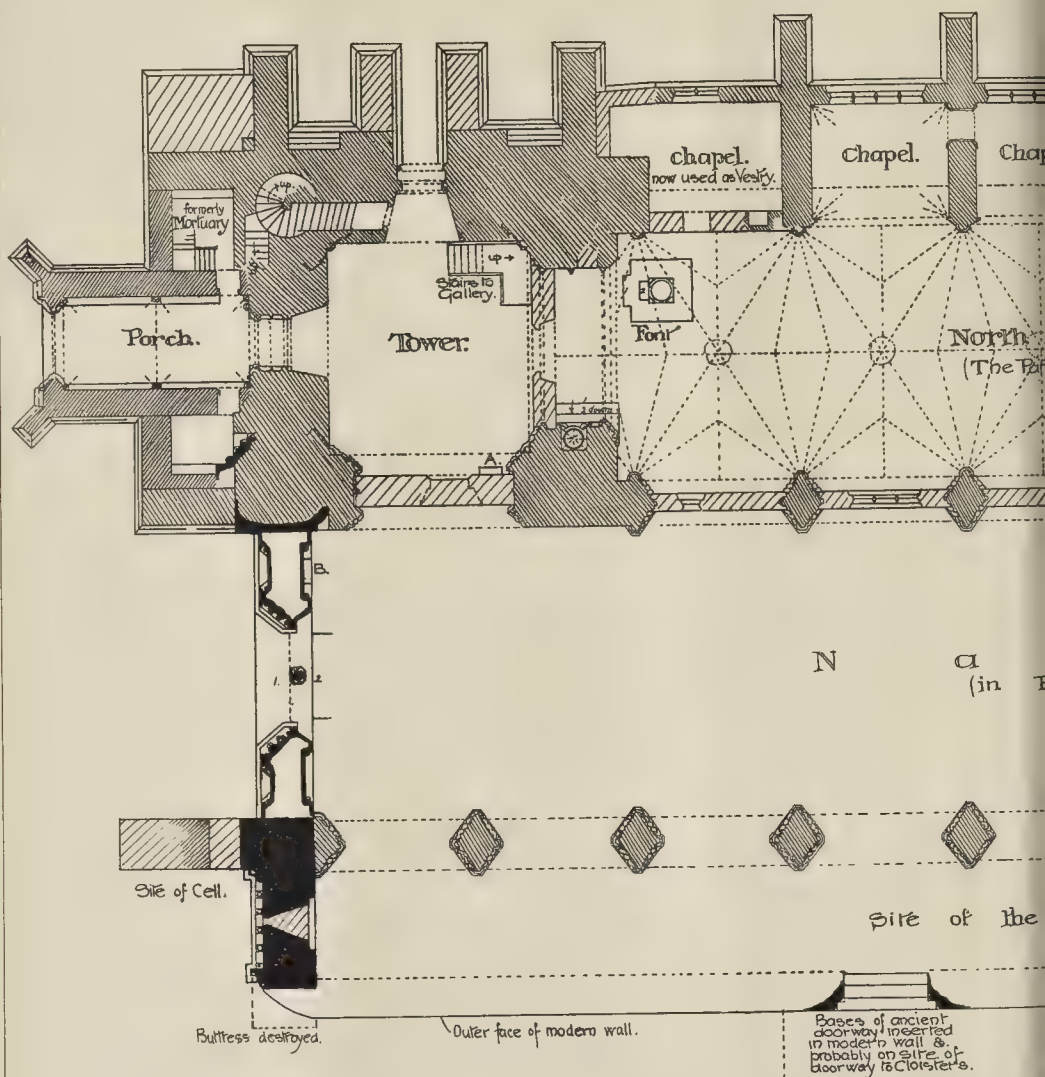
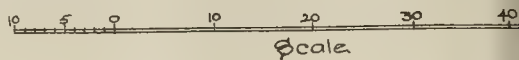






# Croyland Abbey Church

## Ground-Plan.










Feet.

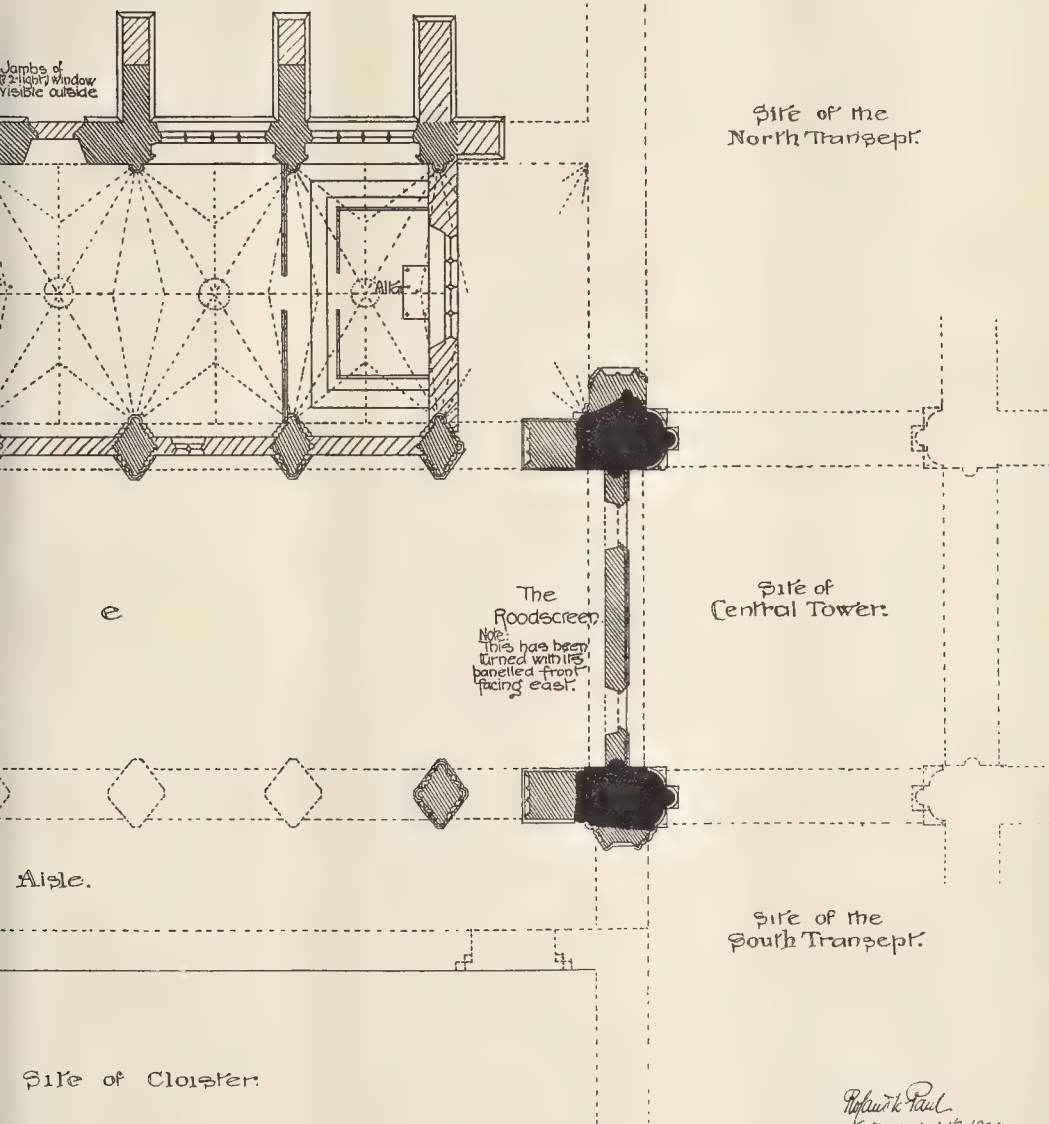
Monuments.

A. Slab of Wm de Wermington.

B. . . . John Tomsen.

-  Norman.
-  Early English.
-  Perpendicular.
-  Late ditto.
-  Post Reformation.

Conjectural parts shown by dotted lines.



Reynold Paul  
mens. or dalt. 1894

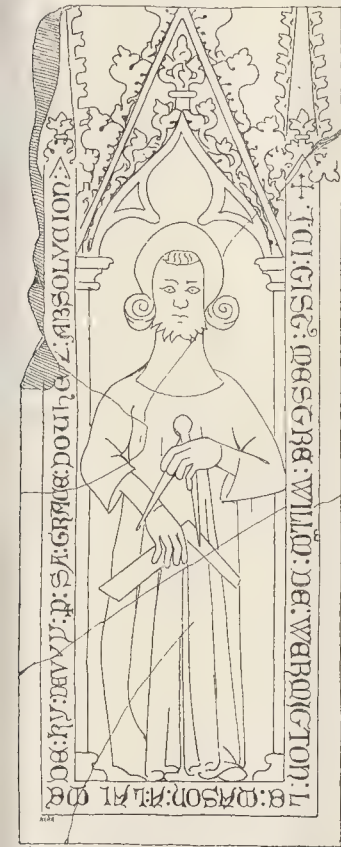




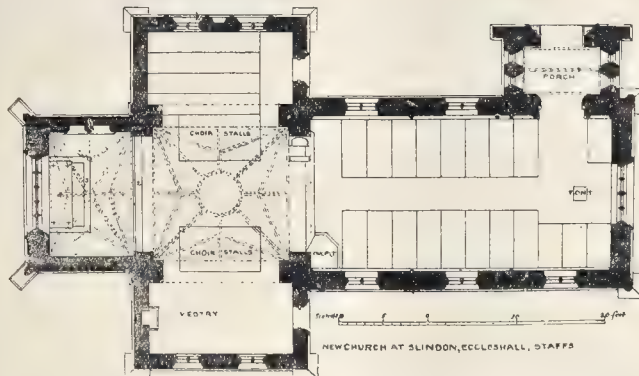
wall is of post-Reformation date. The interior of this aisle has a very spacious appearance, and has some simple and effective vaulting put up by Prior Overton. On one of the bosses (see sketch) is his rebus, a pastoral staff over a tun or barrel, below is a bird holding a scroll in its beak. The other bosses have conventional foliage, the letters Alla (an abbreviation of hallelujah), I.H.C., and grotesques.

Of the three chapels on the North side, the central one retains traces of a rich vault. Across the aisle, at the junction of the fifth and sixth bays, is a wooden screen, still with considerable traces of colour and gilding. This screen was one bay westward in the early years of the present century, and is so shown in the plans published in the *Gentleman's Magazine* for March, 1829. The font at present in use is of Perpendicular date, octagonal, standing on a square base, and raised on one step above the floor-level. There is a second font in a recess of the eastern tower-arch on the south side, with vaulting (both these are here illustrated). A third font of early date is now amongst the fragments in the southern chamber of the western porch, where the remains of the Norman work, before noted, can be seen.

Of the Medieval monuments only two slabs remain. The first and most interesting is a stone with an incised effigy under a fourteenth-century canopy, flanked by pinnacles. On the pinnacle and below the effigy is a marginal inscription, in Lombardic characters:—"ICI : GIST : MESTRE WILLM : DE : WERMINGTON : LE : MASON : A : LALME : DE : KY : DEUY : P : SA : GRACE : DOVNEZ : ABSOLVTION." The effigy holds a T square and compasses, and is habited in a long flowing robe reaching to the feet, and wears a tight-fitting cap. We here



give a measured drawing of this interesting memorial. It was found serving as a bond-stone over the doorway leading from the tower to the



north aisle. It is now placed in an upright position against the south wall of the tower. The second stone is now against the inner face of the west wall of the nave. It has a marginal inscription in Lombardic letters, reading:—PETRE : PRECES : P : ME. PETRO PASTOR : PIE : P : ME. In the centre is a floriated cross, and the words: "Orate p. aia Johannis Tomson."

Under the western arch of the central tower stands the rood-screen. It has, however, been turned round with its pannelled face eastward, and it is conjectural whether it occupies its original position or whether it stood under the eastern arch. Traces of the altar remain in the centre, and on either side is a doorway. The panneling has been much defaced by time and exposure. Everything eastward of this has been destroyed. The old plans of the Abbey, however, show transepts of two bays with eastern chapels, but no western aisles, and a choir with an eastern apse, and square-ended aisles on either side. There was originally also a belfry east of the church, an unusual position, and placed there for reasons that are not now apparent. The cloisters were on the south, and what appear to be the bases of the western doorway from the south aisle of the nave has been incorporated with the modern wall, which now forms the boundary between the site of the church and that of the cloister. A corresponding doorway has been shown on the plan in the easternmost bay of the aisle, next the transept. The plan published by Rev. Canon Moore shows, however, a departure from this arrangement, giving the transept a western aisle, carrying the aisles round the apse, and moving both cloister doors one bay further westward. We do not, however, see any explanation for this view, and in the face of the older plans it seems an unlikely theory.

The conventual buildings have been also entirely destroyed. The great gate was standing till within, we believe, the present century.

As in many other instances, the Medieval builders at Croyland paid but little attention to their foundations, and owing to the peaty nature of the ground the building has caused considerable trouble.\* Four different kinds of stones were used—Helpston, Caistor, Stamford, and Barnack. The great N.W. tower has been underpinned and the foundation built on the gravel underlying the peat, and this portion of the building, together with the west front, restored by Sir Gilbert Scott, in 1860, may be said to be secure. A large amount of work is still necessary, however, in the north aisle, which has been heavily buttressed and shored up, and the interior, although the gallery at the east end has been happily cleared away, is still disfigured by one at the west end, and another which fills up the three chapels on the

north side. Most of the recent work has been done through the energy of the present Rector, Rev. T. H. Le Bouf, and all lovers of Medieval work will be thankful for the care with which everything has been done to preserve this fine fragment from further decay.

#### SLINDON CHURCH, STAFFORDSHIRE.

THIS church is situated in the parish of Eccleshall, which was till lately the home of the Bishops of Lichfield, and is built at the expense of Mr. John Charles Salt. The stone used is a mottled sandstone, quarried in the immediate neighbourhood. The seats and fittings throughout are of oak. The porch and choir are stone-vaulted. Mr. R. Bridgeman, of Lichfield, is the builder, and the stained glass of the east window is by Mr. C. E. Kempe.

The church is dedicated in honour of St. Chad. BASIL CHAMPNEYS.

#### REREDOS IN PRIVATE CHAPEL, DOUGLAS CASTLE.

THE reredos about to be erected in the private chapel of Douglas Castle is to be made of oak, carved, inlaid, and otherwise decorated. The central figure is Our Lord and the Children, while the niches are filled by figures of the twelve Apostles. The subjects of the paintings in the panels are: the Leading of the Shepherds, the Visit of the Kings, and the Adoration of the Angels. The small panels beneath hold descriptive scrolls.

The altar-rail will be of inlaid Devonshire marble; the steps and pavement will also be of marble. The roof has been decorated by Mr. Christopher W. Whall, who will also do the paintings and the stained glass.

H. WILSON.

#### Books.

"*Work and Wages*"; being papers and addresses by LORD BRASSEY. Edited by J. POTTER. With an introduction by GEORGE HOWELL, M.P. London: Longmans, Green & Co. 1894.

THESE speeches and addresses on various points connected with labour and its remuneration, by one who combines in an unusual degree practical knowledge with fairness and impartiality of judgment, were well worth collecting and putting on record. Although some of them, perhaps, belong to a period too far past, in the present rapid movement of public opinion on such questions, to be applicable at the present moment, they form at all events valuable landmarks of the stages through which thought and practical change have gone; and a great deal of the information and advice contained in them is far more permanently true and applicable than recent leaders in the labour movement would at all like to think.

The even balance of mind as between the interests of employers and employed which is displayed throughout these essays and speeches is remarkable. It would be difficult to conclude from internal evidence alone, whether the author

\* The defective nature of the foundations may be seen from the following description of that of the S.-W. Pier of the Western Tower:—

- 1 ft. 6 in. of Peat (oak piles, in length 5½ ft., were found driven through this peat bed and into the gravel.)
- 1 ft. 4 in. Helpston Stone laid dry (i.e. without mortar) and on their edge.
- 9 in. Light stone quarry dust.
- 3 in. Helpston Stone, very small, laid on their bed.
- 1 ft. 1 in. Light stone quarry dust.
- 11 in. Helpston Stone, very small, laid on their bed.
- 1 ft. 3 in. Tower base below present ground level.

Total depth 7 ft. 8 in. from ground level. From the Report of Croyland's report.



were a capitalist or a "labour member," except that there is evidence of that wide practical experience and knowledge which is hardly possible except to those who have been in a position to make an extended survey of contemporary life. Cradled as he may be said to have been amidst some of the greatest labour enterprises of the century, Lord Brassey has been in a peculiarly favourable position for appreciating both the capitalist's and labourer's point of view, and for bringing forward practical lessons from events with which he was closely connected, and the significance of which is in danger of being forgotten. He reminds the reader more than once in these pages of that remarkable invasion of France by 5,000 English workmen for the construction of the Paris and Rouen railway; an event which was accepted by the French employers without any hostility; and points to the English artisan the lesson that such transference of labour is as fair one way as another; that he would have no more right to complain of the importation of 5,000 artisans from the Continent who could do any particular class of work better or more cheaply than English labour would do it, than the French artisan had a right to complain of that celebrated importation of navvies by Mr. Brassey. Yet if any analogous importation were actually made into England, what distastes of platform oratory we should hear, what incitements to the "peaceful picketing" (as it is jocosely termed) of the works on which such imported labourers were employed!

It is more especially as an example of calm and judicial consideration of both sides of the question that this book of Lord Brassey's may be recommended to the attention of those who are practically interested in labour questions. When the author tells us his father's experience that there is a remarkable uniformity of cost in the production of the same kind of work all over the world, notwithstanding differences in wages; that the English navvies at 5s. a day in France did the same amount of work more cheaply than the French labourers at 2s. 6d. a day; that the cost of railway work in India was nearly the same as in England, although the wages paid to the native coolies were only about 6d. a day; he may be taken as a practical advocate of one of the favourite doctrines of the labour-leader of the present moment—viz., that higher wages and shorter hours mean more work for the money. But those who welcome this piece of practical testimony on their side will scarcely be equally pleased with Lord Brassey's persistent and almost unqualified recommendation of the system of piece-work, and his quotation of his father's testimony and experience in its favour, as the system which, under adequate supervision, "is equitable alike to the employer, the workman, and the public."

"There can be no objection to mechanics earning 7s. or 8s. a day, provided they have fairly earned their wages by a just amount of work. The employer will raise no objection to the payment of a liberal scale, so long as he knows what he will be required to pay, and how much work will be done day by day. On the other hand, it is utterly wrong that good men and bad men should be paid at a uniform rate of 10d. per hour.\* It is a system which never could have been forced on the building trades but for the unusual secrecy of labour. . . . No industrial organisation can be sound in which, to use the words of Mr. Herbert Spencer, 'duty done and income gained do not go hand in hand'; and the failure will be great in proportion as the dependence of income upon duty is remote."†

That at least is as true now as it was seventeen years ago; it is a general principle applicable to questions of labour and remuneration all over the world and for all time, and one which in some quarters seems in danger of being utterly forgotten. Such forgetfulness will infallibly bring a retribution after it, sooner or later.

Another important point which is touched upon more than once in these papers is the superior force of circumstances over any organisation, in the long run, in determining the state of wages. In the same paper from which the above extract was taken, we find a memorandum in the form of a table showing the increase in the rate of wages in various trades over a period of ten years (1865 to 1875), coupled with the remark that the table shows that the price of labour is not determined by the completeness of its trade organisation, but by its relative scarcity. "In the instances before us we see that the advance has been most conspicuous in the case of labourers who have no trades union organisation." And on another page we find the same thing put

even more strongly: "An exaggerated impression prevails of the power of the trades unions to advance wages by the mere completeness of their organisation. . . . They cannot possibly force the employers to carry on their operations at a loss, neither can they compel the public to buy an article or build a house at a price which they cannot afford to pay."

It is to be hoped that these and other plain and incontrovertible truths, coming from a writer who shows over and over again his sympathy with labour, may come under the notice of those who need to have such truths brought home to them, and be read, marked, learned, and inwardly digested.

*Hints to Operative Painters.* By WILLIAM FOURNISS. London: Painters' Hall, 1894.

THIS small and cheap pamphlet consists of four lectures delivered by the author in Painters' Hall at the desire of the Paper-stainers' Company. They are very practical and sensible lectures, and may be of use to others than operative painters, in giving a summary of the practical process of house-painting. The author's aesthetic position in regard to such matters as marbling and graining is, however, considerably out of date. "Graining," he says, "is a very desirable decorative adjunct to painting, as it wears well, looks well, and meets the requirements of people who could not perhaps pay for the real woods or marbles specially selected for uniformity of grain." The simplicity of this latter remark is pathetic. "If you have originality and invention you can vary the markings to that extent that people who see your work will give you the tribute of honest admiration." Marbling, it is said, presents a wide and interesting field for imitative talent. The author advises that in all cases "a piece of real marble, or at least a good specimen of imitation, should be obtained as a guide as to character and to practise from." The italics are ours. It is a pity Mr. Fourniss did not confine himself to the practical side of painters' work; in other respects his book is a good and useful one.

*Trigonometry in a Nutshell.* By W. H. BIDDER. London: Gale & Polden.

THIS is a folding card, containing on one page a table of natural sines and cosines for every degree in the quadrant, the other page containing formulae for calculating sides and angles of right-angled and other triangles from given data. The card is very small, and can be carried in the pocket.

#### TRADE CATALOGUES, &c.

WE have received from Messrs. Hazell, Watson, & Viney the Gas, Water, and Electric-Lighting Company's Directory for the year from June, 1893, to June, 1894.—From Mr. Duncan Tucker, Horticultural Builder and Hot Water Engineer, we have an illustrated catalogue of greenhouses, boilers, hot-water pipes and connexions, and other fittings required in horticultural work.—Messrs. Russell & Co., Electrical Engineers and Contractors, send us a large and important catalogue, illustrated [with elaborate drawings of various forms of dynamo engines for furnishing power for electric light supply, and electric bell and light furniture of every kind]. Their catalogue contains also a good deal of useful practical information and suggestion as to the points to be considered in providing for an electric installation.

—We have received the illustrated catalogue of the "Tubular Lock Syndicate," who have made some improvements in the internal make of these locks calculated to remedy a weak point that formerly existed in the construction. This lock possesses many convenient points, as it can be used either as a right or left hand lock by means of its reversible bolt, and the same bolt acts either as a latch or as a lock, and can be used with a key only or with a latch and key. There may be difference of opinion as to the constructive advantage of the circular mortise over the rectangular one; the tubular lock takes up rather more of the thickness of the door. In the main, however, this is a very clever lock, which deserves attention.—We have also the illustrated catalogue of the "Water Carriage Engineering Company," of Sheffield, containing illustrations of their automatic flush tank and of their various forms of trough closets and single closets, and their seat-action closets for railway stations, hospitals, &c. If they have produced a seat-action closet that can be depended on to

remain in working order, it ought to have a success. Generally speaking these things are found out of working order at railway stations. This one seems carefully designed for its purpose. The "ornamental" lavatory-stands are the only things we object to in the catalogue; as usual, they are not ornamental in the proper sense of the word. The best is the "range" one, which is sensibly designed and simple in form.

## Correspondence.

To the Editor of THE BUILDER.

### SEWER AND DRAIN VENTILATION.

SIR,—The majority of believers in the interceptor appear to assume, first, that every house-drain is connected to a large brick culvert big enough for a man to enter; secondly, that a 4-in. soil-pipe ventilator, in the absence of the interceptor, is able to draw air from any part of a system of sewers in unlimited quantities; and, thirdly, that the interceptor is a perfect barrier to this action.

A system of sewers to which house-drains are attached, consists chiefly of glazed stoneware pipes ranging from 9 in. to 18 in. diameter, the lengths decreasing as the diameters increase; these discharge into the brick sewers, which form the lower parts of the system, where the large factories are generally placed. In an ordinary town the brick sewers are about one-tenth of the whole system.

With an efficient water supply to the water-closets, and the drains and sewers properly laid, to give a minimum velocity in the latter of 3 ft. per second, they are practically self-cleansing; it is only in a few isolated cases where there is any difficulty in obtaining this velocity, and there special flushing is required to assist it. Every Borough Surveyor has a few lengths of sewer of this kind, and the public are very apt to take the worst out of a sample of the whole, and condemn the system accordingly; hence the faith in traps.

Ventilation was only adopted reluctantly, as an unavoidable necessity, after everything else had failed, and the advantage of ventilation properly applied is, that it deals with the vapour arising from fresh sewage, and renders it harmless before decomposition sets in; but ventilation should not be asked to deal with decomposing sewage, nor be blamed for defects of design or construction in the drains and sewers, or it has not a fair chance.

Street-gratings alone, and shafts alone, are neither of them ventilation, but simply vents for the relief of pressure, but it requires the judicious combination of both to produce proper ventilation. The interceptor is a re-action in favour of partially bottling up the sewer air, which does more harm than good, and attempts to deal with the symptoms instead of with the cause of the disease.

Mr. Cain's patent cotton-wool filter is an ingenious but expensive plug, or will be, in a short time, when it gets clogged up with road dust, and is applied to more than five street-gratings upon a length of 300 yds. of sewer; it is this limited application which accounts for the pressure being so light in the Worcester experiment.

With small street-gratings at every 100 yds., and every drain and soil pipe acting as a vent shaft, each length of 100 yds. of sewer can be completely isolated, as far as the aerial contents are concerned, without traps or flaps, or other obstructions, because each additional shaft simply increases the draught of air entering the nearest street-grating, and it is impossible for any shaft to draw air, or gas, from any greater distance than the nearest street-grating, just in the same way that it is impossible for a pump to draw water if there is a hole in the suction pipe—the action of the pump is limited by the position of the hole.

Mr. Buchan's ideas of logic are hazy. The interceptor, it is true, is a syphon trap, but it is under totally different conditions to that connected with the closet; the interceptor is an unventilated trap on the sewer side, and therefore liable to be forced; while the closet trap is ventilated by a 4-in. soil pipe, and if a fan were set to work to exhaust the air from the top of the soil-pipe it would have no effect upon the trap as long as the inlet below was kept open.

Waste of water from leaky fittings is fortunately not universal, as a rule about 12 or 15 per cent. of the house supplies leak at night, but the waste is so sub-divided that it is useless for flushing.

My friend Mr. Phillips quotes Bristol, where the sewers are not intentionally ventilated, but there is no such thing as an unventilated sewer; it will ventilate itself somehow—either by the rain-water pipes or elsewhere; and as to flushing they are exceptionally well off, as they can turn the river Frome and the dock-water through the sewers. Leeds is a town with a large number of pail closets, and should not be compared with a water-closet town like Bristol.

As yet no one has attempted to explain away the facts as regards Frankfort, Memphis, and Lewisham, and the experiments at the Sanitary Institute, which speak for themselves, and I agree with Mr. Phillips that further experiments on a large

\* The italics are ours.

† "On the Rise of Wages in the Building Trades of London"; read before the Institute of Architects, February 4, 1878.



scale are needed, and further, I think that controversial details should not be made compulsory by legal enactment.

R. READ,  
August 7th, 1894. City Surveyor, Gloucester.

\* The above letter, which we received two or three weeks ago, we now insert at the close of this correspondence, which we cannot continue further at present, as we do not seem to be gaining much by it so far. While there is no doubt that some of Mr. Read's points are very well put and are worth careful attention, he certainly has not persuaded us to think that it is time to abolish the intercepting trap to make way for the last new theory, or that it is wise to live in houses directly connected with the sewer system of a town; and we must say that his remark that "the interceptor is an unventilated trap on the sewer side" is rather disingenuous when he knows quite well that the interceptor can be vented on the sewer side, and that this has been done systematically in the town where he recently endeavoured to make converts at a meeting of municipal engineers, and where the efficiency of the system there employed was fully admitted by the majority of the debaters. Indeed, we should consider that the result of the recent Torquay meeting was a complete answer to Mr. Read on his main point.—ED.

### BUILDING-LINE QUESTION.

SIR,—I have to state in reply to an inquiry by D. S. McBean in your last issue, that he cannot under the Public Health (Buildings in Streets) Act, 1888, "without the written consent of the Urban Authority, erect or bring forward any house or building in any street or any part of such house or building beyond the front main wall of the house or building on either side thereof in the same street, or build any addition to any house or building beyond the front main wall of the house or building on either side of the same."

"Any person offending against this enactment shall be liable to a penalty not exceeding forty shillings for every day during which the offence is continued," &c.

HUGH S. CREGEEN,  
Consulting Surveyor to the Bromley Local Board.

SIR,—The authority is acting quite within its powers under Section 155 of the Public Health Act, 1875, in requiring your correspondent to set his new building back from the old building line. The section gives the authority power to "prescribe the line in which any house or building . . . shall be erected," and such power would appear to be unlimited, and applies equally to rebuilding. The latter part of the said Section, however, makes it imperative for the authority to pay "compensation to the owner. . . . for any loss or damage he may sustain in consequence of his house or building being set back!"

HARRY G. ASSITER.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—IN.

RAINFALL, SPRINGS, STREAMS, AND THEIR MODE OF MEASUREMENT.

THE moisture which is constantly being evaporated from the sea and other water surfaces is carried by the air, and is returned as rain and snow to feed the springs and streams, and is again, in turn, evaporated to apply the sources of rainfall. There is always moisture present in the air, varying according to the season and situation. In this country the average proportion is stated by eminent authorities to be about 14 per cent. When there is a considerable amount of moisture in the air, approaching saturation, a slight reduction of temperature causes the moisture to become visible in the form of mist, rain, hail, or snow.

The rainfall of a district depends largely upon the position of its mountain ranges and forests, together with the direction of the prevalent winds. It is a matter of common observation in this country that the western and southern shores have an annual rainfall considerably in excess of the eastern shore. The rainfall on the western coast varies from 40 in. to 70 in. per annum, and in an exceptional case in 1883 the great depth of 102.8 in. was recorded at The Sty, in Cumberland. The rainfall on the southern coast varies from 30 in. to 40 in., and on the eastern coast from 10 in. to 30 in., with an extremely low rainfall in 83 of 18.71 in. at Clacton, in Essex.

The distribution of rainfall is very variable over the surface of the globe, due to the peculiar conditions prevailing in each district. In Great Britain the average fall is about 33 in., with considerable variation. Spain has about 100 in. on the Atlantic coast, and from 8 in. to 10 in. at Madrid; India, from 10 in. to 600 in.; in Australia the average fall is about 25 in.; North

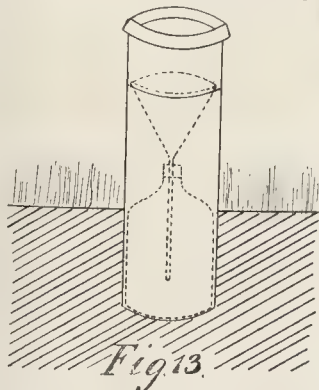
America, 40 in. to 90 in.; South America, from nil up to 270 in.; and in Africa, from nil up to 40 in. The areas over which an occasional shower falls at long intervals, exceeding a year in many cases, and termed rainless districts, are the deserts of North Africa, Arabia, Persia, Belochistan, Thibet, Mexico, Guatemala, California, Peru, and Chili.

There are many cases recorded of excessive rainfall occurring within short periods in this country, causing the bursting of embankments, and floods of great magnitude, where sufficient means of discharging the flood-waters, at such periods, is absent. Buchan states that 3 in. is not infrequently recorded in twenty-four hours in the Highlands of Scotland. At Seathwaite, in Cumberland, 6.62 in. fell on November 27, 1848. A remarkable fall was recorded at the Newport Waterworks reservoir during the twenty-four hours ending 9 a.m. on July 15, 1875, of 5.33 in., which caused two reservoir disasters, viz., at the Rogers Pond reservoir, at Cwm Carn, Monmouthshire, and at the Blakeney Brook reservoir at Cinderford, in Gloucestershire.

In estimating the available rainfall for water supply, it is the minimum rainfall on which all the calculations must be based. Mr. G. J. Symons, F.R.S., who has done such valuable service to the country in organising the complete system of record of rainfall observations, gives the following proportions as the limits of fluctuation in the rainfall. These are the result of a large number of observations extending over many years, and which, he states, will be within 7 per cent. of the actual fall:—

Wettest year	.....	45 per cent. more than the average
Driest	.....	33 " " less " "
Driest two consecutive years	.....	26 " " " " "
Driest three consecutive years	.....	21 " " " " "

The rainfall of a district is estimated from actual measurement by means of rain-gauges. These observations should be taken daily at or about the same time, usually 9 a.m. The number of gauges for any district depends upon the extent of the catchment area, or water-shed, and upon its altitude. The "Snowdon" pattern of rain-gauge (Figure 13) is frequently adopted



for water-works purposes. It has a diameter of 5 or 8 inches. It should be placed on a level base of stone or other material, and either a recess cut in the stone to admit the gauge, or pegs driven around the cylinder to prevent lateral movement. The site should be on even ground, with plenty of open space, and at a distance of not less than one and a-half times the height measured horizontally from plantations or buildings. The top of the gauge should stand 12 inches clear of the ground. The gauge consists of a copper cylinder, provided with a funnel of the same metal to receive the rain and prevent evaporation. The tube of the funnel terminates in a glass cylinder, which retains the rain-water until the observer has measured the depth of water in a graduated glass measure for the purpose. The altitude of the rain-gauge should be carefully taken by connecting its height with the nearest ordnance bench mark.

The rain and snow which fall on the surface of the earth are disposed of in the following ways:—

- 1.—Evaporation.
- 2.—Percolation.
- 3.—The remainder flows off as storm or flood water.

1.—Evaporation, or the power of water to rise

in vapour, has received the attention of many eminent observers, among whom may be mentioned the names of Evans, at Nash Mills; Gilbert and Lawes, at Rothamstead; and Greaves, at Lea Bridge, near London. The latter found the annual evaporation from large water surfaces was about 21 in., and was distributed in the following proportion during the year:

January to March	.....	4 in.
April to May	.....	8 "
June to September	.....	7 "
October to December	.....	2 "

The amount of evaporation from large water areas is in most cases equal to the rainfall, therefore in estimating the yield of a watershed or catchment the area of the lake or reservoir should be excluded. The evaporation from land surfaces varies according to the geological and physical conditions prevailing in the district, and any fixed rule is impossible. Steep slopes in the lower series of rocks afford the greatest flow over the surface and little evaporation and percolation. Plantations lessen the loss by evaporation. The amount of evaporation on land surfaces in this country varies from 8 to 20 in., and in hotter climates is much greater; in parts of India it varies from 55 to 90 in., and on water surfaces the average is usually taken at 72 in.

The Dead Sea and the Mediterranean afford examples of great evaporation.

2.—Percolation, or the passage of rainfall through the surface of the ground, varies also according to the geological and physical conditions. The first recorded experiments in this country were made towards the end of the last century by Dr. Dalton, of Manchester, and have been continued by Dickenson and Evans, Gilbert and Lawes, Greaves, Latham, and others. In the evidence before the Royal Commission on Metropolitan Water Supply, 1893, the following particulars were given as to the percolation through 3 ft. of soil, with grass growing on the surface, and 3 ft. of chalk, also with grass growing on the surface, at Nash Mills, Hemel-Hempstead, and to these are appended the results obtained from Lea Bridge and Rothamstead:—

District.	Period.	Medium.	Rainfall.	Percolation.
Nash Mills	1842 to 1884	feet.	inches.	inches.
		Soil 3	27.40	6.77
	1884 to 1888	Chalk 3	27.84	10.55
Lea Bridge	1863 to 1871	Soil 3	28.94	7.63
Rothamstead	1871 to 1892	Soil 5	30.11	11.90

In the Rothamstead experiments a solid block of earth was enclosed in a water-tight tank, and in each case the experiments were made with level surfaces.

3.—The storm or flood water varies according to the absorbent power of the ground over which it flows, together with the amount of evaporation. It either flows off the surface to form streams and rivers, which supply many towns, such as London, York, and Chester, or it may be impounded in the head-waters for the supply of towns at a distance. The average summer flow of water-sheds with rocks of medium absorbing power and steep slopes does not, as a rule, exceed 3.12 gallons per 1,000 acres per second. In times of flood the flow off such water-sheds requires special precautions. Heavy rainfalls, causing excessive floods, have occurred during the construction of reservoir dams, and are not by any means unusual; among others may be mentioned the following:—

Reservoir.	Owner.	Date.	Gals. per second 1,000 acres.	Rainfall per 24 hours.
Woodhead	Manchester Corp.	Oct., 1849	Gals. 3,123	12 in.
Rhodes	Wood	Feb., 1880	1,650	5.96
Vyrnwy	Liverpool Corp.	Jan., 1883	1,112	4.74
Vatry	Dublin Corp.	—	3,202	10.22
Tansa	Bombay Corp.	—	4,610	17.71

An inch of rainfall per twenty-four hours per 1,000 acres is equivalent to 42.01 cubic ft., or 261.951 gals. per second:—

1 in. per acre = 100 tons = 22,400 gals.

Although such extraordinary floods are of short duration, and occur at intervals of some years, yet the circumstances attending them must be taken into consideration in the design and construction of reservoir works, by providing means of passing such floods through the works without endangering them, and that such means



of exit shall be at all times clear, without the aid of manual or mechanical labour being required. The average daily flow of some of the large rivers is given below:—

	Per day.
River Thames, at Ditton.....	900 million gals.
" Severn.....	300 "
" Ouse, at York.....	140 "
" Tiber (Italy).....	5,500 "

To arrive at an accurate estimate of the quantity of water available in a catchment area, it is necessary to have rain-gauges fixed as previously stated, and recorded every day with simultaneous gaugings of the flow of water in the streams and springs. Careful attention must be given to the stratification and dip of the rocks, as it is by no means an infrequent occurrence for a large portion of the rainfall to follow the dip of the strata and rise as springs in an adjoining watershed. The gauging of the rainfall, streams, and springs should extend over as long a period as possible, in order that the necessary calculations may be based upon reliable data. The experiments and results given as to evaporation and percolation are instructive and interesting from a scientific point of view, but have been carried out on too limited a scale to be relied upon for the general purposes of water engineering.

#### OBITUARY.

MR. H. FAJIA.—We regret to record the death of Mr. Henry Fajia, M.Inst.C.E., which occurred at his residence, Riverbank, Sunbury-on-Thames, on the 21st ult. He was the son of G. Fajia, the artist and miniature painter to the Queen, and was born at Alfred-place, Bedford-square, W.C., in 1844, and educated at University College School. He was articled to the firm of Westwood, Bailie, Campbell, & Co., shipbuilders of the Isle of Dogs, E., but the firm failed before he had completed his articles. He then went north, and, for a young man, occupied important positions—first with Messrs. Hopper, of Hull, and afterwards with a firm of shipbuilders on the Tyne. After a brief partnership with a firm of engineers at Stoke-on-Trent, he came to London about 1870, and started practice as an engineer in John-street, Bedford-row. On obtaining a commission to design and erect some cement works, the rough-and-ready methods then in vogue impressed him with the vast field for improvement in that branch of industry, both from an engineering and scientific point of view, from that time he made a speciality of cement works, and thus commenced his career as an expert in all matters relating to cement and cement-making materials. He has since designed and erected works for the production of cement in various parts of England and abroad, including Brazil and the United States. About 1880 he removed to 4, Great Queen-street, Westminster, and there established a cement-testing room and chemical laboratory, where cement and cement-producing materials were examined and reported upon; the steady growth of this branch of his practice was an indication of how much his opinion was valued, and in 1888 he found it necessary to remove to larger premises. Mr. Fajia was a member of the principal engineering and learned societies, viz., The Institution of Civil Engineers, Institution of Mechanical Engineers (1869-1889), British Association, Royal Institute of British Architects (Honorary Associate), Society of Arts, and Society of Engineers, of which latter body he was Vice-President at the time of his death. He at various times contributed papers to all the above Societies on the subject of which he had made a special study, and was awarded premiums by the Society of Engineers for papers read before that body in 1888 and 1889. The latter papers were prepared with the object of combating the "magnesia" scare which occurred at that time owing to the Aberdeen failures, and were written to prove that the supposed destructive effect of sea water on a properly-manipulated cement concrete was a scare and nothing more. In 1881 he wrote a treatise entitled "Portland Cement for Users," and has been a contributor to the *Builder*, *Engineering*, and the leading professional papers. During a long experience Mr. Fajia accumulated a vast amount of precise scientific data, based upon careful experiments with cements and cement-producing materials from all parts of the world. These experiments and tests have been made with instruments chiefly of his own invention. Mr. Fajia was specially invited by the American Society of Civil Engineers to communicate a paper on the subject at the Chicago Exhibition last year, extracts of which were published in the *Builder* for September 16, 1893. The work of his office and laboratory will be carried on by Mr. Butler, who for many years has worked with Mr. Fajia as his chief assistant.

#### GENERAL BUILDING NEWS.

RESTORATION OF ST. MARK'S CHURCH, LUXTERHEAD, SURREY.—This building has just been restored, after fire, and additions, consisting of new study and extension of the porico at north entrance, have been made. Messrs. Holland & Hannen,

London, have been the builders employed to carry out the works. The building throughout is constructed as far as possible of fireproof materials, and represents a total outlay of about 17,000l. The sub-contractors are:—Heating, H. Hope, Birmingham; wiring for the electric lighting, the Planet Company, London; electric bells, &c., A. W. Jackson, London; luggage-lift, &c., Waygood & Co., London; parquet flooring, Mr. Ebner, London; revolving shutters, Messrs. Francis & Co., London. Fire hydrants, hot and cold water supply, kitcheners, &c., have been supplied and fitted up by Mr. T. Boulting, London. Messrs. Doulton & Co. supplied baths, and portions of the stoves, and glazed-warm chimney-pieces; and Messrs. Walker & Sons portion of stoves and wood chimney-pieces, &c. The architect is Mr. P. B. Chambers, of Brighton. Mr. J. H. Verrell has acted as clerk of works.

ADDITIONS TO BUILDINGS, Kew GARDENS.—Extensions are about to be made to the Temperate House in Kew Gardens by adding two wings at the north and south ends, which will increase the size of the building by about half its present dimensions. The cost will amount to about 12,000l. Among other improvements which are being carried out is the overhauling and re-arranging of the whole of the heating apparatus in connection with the Palm House, and the provision of additional piping, which is to be placed round the lantern in the roof. The south wing of the large conservatory, known as No. 4 House, is also in course of reconstruction to meet modern requirements. This is the final instalment of the work taken in hand in connection with this house three years ago, and completes the reconstruction of the conservatory.—*Morning Post*.

UNITED METHODIST CHAPEL AND SCHOOLS, WEST HARTLEPOOL.—On the 22nd ult. the foundation-stones of the new United Methodist Free Chapel and Schools, in York-road, West Hartlepool, were laid. The estimated cost of the structures amounts to 4,250l. Their total length will be 133 ft. by 73 ft., and the chapel will be a two-story building, having both tower and spire. It will seat 500 persons. The architect is Mr. Dunnipace, and the builders Messrs. Cockburn & Sons, both of West Hartlepool.

THE BUILDING TRADE IN GLASGOW.—While, in consequence of the coal strike and from other causes, the majority of industrial trades in Glasgow are at present quiet, this is not the case with the building trade, in which the operative masons, stonemasons, and joiners are fully employed, and it is estimated that from 500 to 600 additional masons and builders could easily find employment in the city. Notwithstanding the depression in other trades, master masons have been short of men for a considerable time now, and there is a standing difficulty in procuring the sufficient number of tradesmen to carry on the various works in process of erection so as to fulfil contracts. Besides a large number of tenement buildings, there is unusual briskness in erecting handsome structures in the city, which gives steady employment to a considerable body of the men. An excellent arrangement, which prevails between employers and operatives is that there is an annual conference held in April, which fixes the standard wages for the year. It works well, and the present standard is 8½d. per hour. Those conferences have existed for the last ten years, during which time there has been no friction, either in respect of wages or of the conditions of employment. There are said to be large numbers of men in the South who cannot get employment; and even in the United States, where it is customary for many of our countrymen to seek employment in summer, returning to their homes in winter, the building trade is in a depressed state. Notwithstanding the great increase of the city, it is said that in 1871 and 1875 there were more masons, builders, and brewers than there are at present.—*Glasgow Herald*.

NEW CHURCH AT FELIXSTOWE.—A new church is being erected at Felixstowe, from plans prepared by Sir Arthur Blomfield, A.R.A., & Sons. In the building at present in course of erection accommodation will be provided for 688 worshippers, the cost, exclusive of the site, being estimated at 4,500l. The site of the new church is situated in Tower-road, on what was a portion of Wadgate Farm. The contractors are Messrs. J. Dorey & Co., of Brentford. The building will for the present be confined to a nave and north and south aisles, with south and west porches, and a tower at the west end. The foundations of the tower and porch are placed in the south-west buttress of this tower. The sitting accommodation will be as follows:—North aisle, 162; south aisle, 150; nave, 376. The body of the church will be 80 ft. in length, and 58 ft. wide, not including the porches. At the east end, where it is intended the church should be completed, a temporary wall will be erected. The building will be of red brick, locally made, with Bath stone dressings, and in Early English style. Light is to be provided by a series of clerestory quatrefoil windows, and filled with cathedral-glass. The roof will be open-timbered, the nave covered with Broseley tiles, and the aisles with lead. The floor will be of pitch-pine, and for the present chairs will be used. A heating-chamber will be built under the north-east corner, and a hot-water system will probably be adopted. The portion which will remain to be built consists of organ-chamber, vestry, chancel, and chancel aisle.

COTTAGE HOSPITAL, WOOD GREEN.—On the 25th ult. the foundation-stone was laid of a Cottage Hospital for Wood Green. The architect of the new building is Mr. Charles Bell, of St. John's Hall-court, and the builder Mr. Charles Wall, of Chelsea. ENLARGEMENT OF WESLEYAN CHAPEL, PAULTON, SOMERSET.—The enlargement of Paulton Wesleyan Chapel has just been completed. The architect was Mr. W. F. Bird, of Midsomer Norton, and the contractor Mr. Gait, Ston Easton. The chapel will now seat 550 people. There are two new vestries, and a new organ chamber have been built, allowing a lengthening of the gallery.

THE BUILDING TRADE IN DUNDEE.—While so many other trades are suffering severely from the general depression overhanging the city, the building trade in Dundee, says the *Dundee Advertiser*, is at present, and is likely to be during the approaching winter, in a prosperous condition. In the early spring appearances pointed to a very slack summer and autumn, but as the year wore on contracts became numerous, and operations have become increasingly brisk. The new work consists almost entirely of the erection of tenements of dwelling-houses of different classes. Besides these, however, there are at present on hand several large buildings which will give employment to many workmen for months to come. Of these the chief are the Industrial School for Girls at Balgay, Loches Public Baths and Library, the Smallpox Hospital, the Baptist Church in Ward-road, and the Royal Hotel extension. The dwelling-houses which are being, or are about to be, erected, are pretty equally distributed over the city. The masons are fully employed, and it is said that if more could be obtained from other cities—such as Glasgow and Edinburgh, where building is also brisk—they would be at once engaged. Meantime slaters and joiners are not so busy, but the condition of affairs will be altered in the course of a few months, when their services will be required upon the many buildings now in course of erection.

#### SANITARY AND ENGINEERING NEWS.

PETERHEAD HARBOUR OF REFUGE.—According to a recent Parliamentary paper containing the Engineer's Report for the year 1893-4, as to the above, and the Memorandum of the Navy Director of Works thereon, progress is being made both with the South Breakwater and Barge Harbour, Peterhead. The former was extended 105 ft., the foundations of a further length of 40 ft. were prepared, and the work was brought up partly to the level of 2½ ft. above, and partly to 4 ft. below, low water. As during the previous year, the foundation work involved a great deal of rock excavation and levelling under water by divers. A length of 156 lineal feet of the Barge Harbour Sea-wall was built and backed with rubble. The whole of the blocks for the sea and quay walls have been made. The staging in the harbour was extended about 200 lineal feet, and the necessary approaches thereto were made. The rock excavated from the bed of the river to form the new basin was above low-water-level, 1,067 cubic yards; below low-water-level 945 cubic yards. The quarry has been further opened out by the removal of decomposed rock, and the workyard, railway, &c., have been properly maintained. Additional plant has been provided, consisting of steam-crane, travelling cranes, trolleys, diggers, &c. The daily average numbers of men employed upon the works were: Free men, 133; convicts, 229. As far as can be seen at present, the original estimates will not be exceeded.

WATERWORKS, MORLEY.—The new waterworks constructed by the Morley Corporation were opened on the 25th ult. by Mr. R. B. Hopkins (Town Clerk) said that the waterworks had been constructed under powers conferred upon the Corporation by the Morley Corporation Water Act, 1890. The scheme comprised a storage reservoir, called the Withens Clough Reservoir, at Withens, about 3½ miles from Mytholmroyd; two catch-water conduits, and an iron-pipe aqueduct, through which the water is conveyed from the reservoir to Morley. The supplies of water are obtained from gathering-grounds 1,400 acres in extent. The minimum dry weather quantity is about 250,000 gallons per day, the maximum quantity during the wet seasons being very considerable. Compensation water is sent down the streams from the reservoir at the rate of 580,000 gallons per day. The storage reservoir and works occupy an area of 80 acres, the water area of the reservoir when full being 65 acres. The capacity of the reservoir is 330 million gallons, and the depth of water above the drawing-off culvert is 60 ft. The greatest depth of water in the reservoir is 20 ft., and the centre height of the embankment above the stream level is 8½ ft. The level of the overflow of the reservoir is 950 feet Ordnance datum, and the level at which the water is drawn off for supply is 900; and the aqueduct which conveys the water from Withens Clough to Morley is 21 miles in length, and is a line of 15-in. iron pipes throughout. The sources of supply were selected and the works have been designed by Mr. Charles Goss, C.E., of Bradford; and the contractors for the various works were as follows:—For the reservoir works, Messrs. Fotherby & Sons, Burnley; for the making and delivery of iron pipes, the Staveley Coal and Iron Company; for laying the pipes and iron girder bridges, Mr. David Barry, Ratcliffe-on-Trent, the



iron girders being supplied by Messrs. John Butler & Sons, Stanleingly; and the valves, hydrants, and fittings by Messrs. J. Blakeborough & Sons, Binglehouse.

#### STAINED GLASS AND DECORATION.

**WINDOW, TRELLECK CHURCH.**—A stained glass window has recently been placed in Trelleck Church, near Monmouth, consisting of three lights and traceries, representing "The Resurrection." The designers were Messrs. Heaton, Butler, & Bayne, London.

**DECORATION, CATHOLIC CATHEDRAL, NOTTINGHAM.**—The Catholic Cathedral of St. Barnabas, Nottingham, was re-opened on the 26th ult., after interior restoration and decoration, the style employed being pure Early English, corresponding with that of the cathedral throughout, from designs by Mr. Thomas F. Norman, ecclesiastical decorator, Warwick.

**CHANCEL WINDOW, WARHAM CHURCH, NORFOLK.**—The chancel window of the ancient church of Warham All Saints has just been enriched with stained glass. The centre light represents our Lord crowning child saints. The south light is embellished with female saints—viz., the Virgin Mary, St. Cecilia, and St. Eunice leading Timothy, which represents the education of the Church. The north light is figured with St. John the Baptist, St. Stephen, St. John the Divine, and St. Peter, kneeling in front with the keys. The designer was Mr. Lonsdale of London, and Mr. Arthur Reeve of London was the architect. The staining and glass work was executed by Messrs. Heaton & Butler, of London, while the stone-work was entrusted to Mr. Hawes, of Norwich.

#### FOREIGN AND COLONIAL.

**FRANCE.**—The work for the foundations of the new Opéra Comique has been commenced, under the direction of the architect, M. Bernier. A competition is to be opened at Ribémont (Somme) for the erection of a monument to François Blomet, the architect. A new travelling suspension bridge is to be built at Bordeaux on the same plan as one in operation at Bilbao. It will consist of steel girders carried at an elevation of 45 metres above the water level of the Garonne by chains attached to steel towers 95 metres in height. These girders will carry a car moved by electric power from either end, beneath which will be suspended a travelling platform with seats and shelters for passengers. The crossing is to occupy about two minutes, and the platform will be capable of taking 150 persons at each trip. The width of the river at the point of the proposed bridge is 470 metres. M. Fournier's great picture, "Les Gloires de Lyon," which we remarked upon in noticing the Salon of this year, has just been fixed up in the Council-room of the Prefecture of the Rhône. The Minister of Public Works, accompanied by M. Krantz, member of the Chamber of Deputies, and by the "Directeur Général des Chemins-de-Fer," has been visiting London and Liverpool, to study the working of the Metropolitan railway in the one city and the electric railway in the other. The monument to Testelin, to which we have already referred, and which was a conspicuous object in the Salon of this year, has just been erected in the Place de Strasbourg, at Lille, and was inaugurated last Sunday. It consists of a stele of white marble supporting a marble bust of Testelin, while around the stele are grouped three soldiers encouraged by a winged figure in the rear, who seems to point out the enemy to them. On the other side is a seated figure representing the town of Lille. These various figures are in bronze. The whole stands on a pedestal of blue Soignies stone, with a margin of turf round it, bounded by a balustrade of the same stone. The whole of this is again raised on a stone plinth, decorated on its principal face with a seated figure of the Republic in white stone. M. Cordonnier is the sculptor, and M. Bonnier the architect of the monument. The monument to the memory of Claude Bernard is to be inaugurated at Lyons on October 28. A committee has been formed at Angoulême to raise a monument to the memory of President Carnot. This monument, on which 40,000 francs are to be expended, will be the subject of a competition, restricted to architects and sculptors born in the Department of the Charente.

**SWEDEN.**—The death is announced of the well-known Swedish architect, Herr Aksel Fredrik Nyström, at the age of sixty-two. Since 1863 he held the appointment of Crown Architect, being the designer of various important public buildings, as for instance the Naval College and the Public Record Office, Stockholm, the great theatre in Gefle, Berga Church, and others. His architectural building operations were very extensive. The cost of the buildings of the Industrial Exhibition to be held in Malmö in 1895 is estimated at 95,000 kr. The construction will be by the Architect, Herr S. Sörensen. The production of fire-proof bricks and tiles at the great Höganäs Brick Works in 1893 amounted to 7,389,000, as against 9,500,000 in 1892, or a decrease of 2,201,000. The sales amounted to 7,622,000, as against 7,716,000 in 1892, of which 1,950,000 were sold inland, and 5,672,000 abroad. The Swedish Consul at Melbourne calls attention to the excellent market to be found

there for Swedish cement, granite, and marble.—"Kärnan," or the great tower of the ancient castle of Helsingborg, on the Sound, the only remains of the latter, has now been restored at a cost of 40,000 kr. It was hitherto in ruins, with a striking and picturesque aspect, and complaint has been made of the "modernisation" of the old tower.

#### MISCELLANEOUS.

**BRITISH BUILDING MATERIALS FOR ROUSTCHOUK, BULGARIA.**—According to a recent report of the British Vice-Consul at Roustchouk upon the trade of that district, a good deal of building has been going on in Roustchouk. The local stone is not very good, but, being easily worked, is capable of making good façades, and is always backed with brick to keep out damp. The buildings are mostly roofed with tin-plate or sheet-iron of some sort. These articles are of British production, but the quality of the former is not so good as it used to be. Local tiles are still used, but they are not good, and many people have tried French tiles, but these have not been very successful. Austrian tiles keep out rain and snow better. Under these circumstances there appeared to be a large field for the numerous terra-cotta articles produced in Great Britain, and several British manufacturers were communicated with for prices-current, with the idea of getting some local man to take up the agency. These articles being made to scale of inches, prices were quoted by squares, feet, inches, or some other measure unknown here. The weights were in tons, cwts., lbs., and the money in £ s d., while people here use the metric system in the former case and the decimal system in the latter. The result was that no one has been found with patience enough to think the enterprise worth his trouble; and any flooring-tiles, roofing-tiles, or terra-cotta ornaments have up till now been furnished by Austria, where the metric and decimal systems are also used.

**PITCH V. CEMENT GROUTING.**—At a recent meeting of the Works Committee of the St. Pancras Vestry, Mr. Purchase said he wished to ask Mr. Blair, the Surveyor, whether any blocks, and how many, had been replaced in Tottenham Court-road and Fitzroy-street; whether any kerbing, and how much, had been replaced there; whether there was any contract for the supply of pitch and oil; and what extra cost it had been to the parish and to the water companies and gas companies when the relaying of trenches had been done by pitch-grouting. Mr. Blair replied he could not say how many blocks in Tottenham Court-road had been taken up, but in no instance, except three, had they been taken up for water-trenches. In those three cases openings had been made to the extent of 3 ft. or 4 ft. square to find out the cause of the moving of the blocks. In Tottenham Court-road no kerbing had had to be re-set owing to the expansion of the wood. In Fitzroy-street the kerbing had had to be re-set, but that was owing to the masons not being able to straighten the kerb before the carriage-way was down. As to a relative cost, he would say that pitch cost about 1d. a yard more than cement. There was no contract for pitch and oil, but these were bought at the ordinary market rates, and there could be contracts if the Committee desired it. Mr. Purchase moved that an instruction be given to Mr. Blair to use cement-grout in the paving of Albany-street. Mr. Blair, he said, pointed to Argyl-street and Park-street as evidence of the superiority of pitch, but in Park-street, opposite the Vestry Hall, the wood-paving, within twelve months of being laid down, had begun to show signs of giving way. If they looked up College-street, it reminded them of a miniature switchback. Let them look at the road opposite the Infirmary, where the tram-lines were an inch and a-half below the blocks. There, after a shower, they could see four little streams running down by the sides of the lines, because the water could not get to the channels. He pointed to the south side of Gordon-square and the south side of Tavistock-square, where, although Jarrah blocks and the best pitch had been used, the blocks had risen and become uneven because pitch-grout had been used in preference to cement. Mr. Munday seconded the motion, urging that cement-grouting had never been a failure in a single instance. Mr. Hawkin moved an amendment in favour of using pitch. Mr. Cooper thought too much reference had been made to Tottenham Court-road. The circumstances under which it was paved were unfortunate. To save ten shillings a thousand, the blocks were obtained of different heights; they were not gauged, and there were no latins between the blocks. The men also were unskilful in the use of pitch, but since then they had vastly improved. Mr. McCrae pointed to Chancery-lane, Long Acre, and Cranbourne-street as evidences of the superiority of pitch over cement. The amendment, having been seconded, was agreed to, eight voting for and six against the use of pitch.

**PRESERVATION OF KIRKSTALL ABBEY.**—The work of preserving the historic abbey ruins at Kirkstall, says the *Leeds Mercury*, progressing but slowly. It is a difficult task, and one not altogether free from danger. Three years have elapsed since

the masons first commenced their labours, and for another twelve months at least they will be busily engaged. The expenditure by the Corporation upon the abbey and grounds amounts already to about 5,500l. The repairing of the vaulting of the chancel and the strengthening of the tower is now engaging the attention of Mr. Micklethwaite, the architect. In 1779 the north-west pier and the north and west arches were utterly destroyed by the fall of two sides of the tower. What is left of the tower had, up to recently, nothing to support it on the north side, and an unusually violent gale might at any time have brought it down. Even now, the masonry of the upper part of the tower is in a very crumbling and unstable condition. The chancel is at present filled with a network of scaffolding poles. The greatest possible care has to be exercised in fixing this scaffolding, the slightest touch in certain parts of the ruins being sufficient to detach large pieces of masonry. The western portion of the church has been secured for posterity. In an especially good state of preservation is the west entrance, where very little new work has been required. With the north transept, on the other hand, it has been found necessary to rebuild a considerable portion. After the preservation of the abbey itself has been completed, the architect will deal with the cloisters, which are now in a very unsatisfactory condition. Traces of the destructive effect of ivy roots are everywhere evident. For a time the clinging ivy, no doubt, strengthened the ruins. When, however, the roots of the creeping foliage had once worked their way between the stones, the latter were displaced as the roots expanded. The grounds around the abbey are not as they might be, though certainly there has been a slight improvement during the past twelve months. Walks have been laid out, an embankment built along the river-side and planted with willows, and a portion of the ground banked off, to eventually be flooded and made into a lake. Mr. Irvine is the clerk of the works.

**ANNUAL OUTING.**—The employees of the firm of Messrs. Roger Dawson, Limited, electric light engineers, Berners-street, took their annual banquet last Saturday. The party, which numbered close upon 100, journeyed by early morning train to Portsmouth, where dinner was served at the Sussex Hotel. In the absence of Mr. Roger Dawson, his co-director, Mr. H. B. Johnson, occupied the chair, and in the course of some remarks he referred to the recent opening of their new works for the manufacture of electric light fittings, and the new show-rooms about to be opened in Berners-street.

**LIFTS.**—Messrs. R. Waygood & Co., of Falmouth-road, Great Dover-street, S.E., have the contract for supplying and fixing three lifts, together with pumping-plant, at the Admiralty Extension Buildings.

#### MEETINGS.

SATURDAY, SEPTEMBER 1.

A.A. Camera Club.—Visit to Ely Cathedral.

TUESDAY, SEPTEMBER 4.

Glasgow Architectural Association. Opening Address of the President, Mr. A. N. Paterson.

WEDNESDAY, SEPTEMBER 5.

Builders' Foremen and Clerks of Works Institution.—Ordinary Meeting of Members. 8.30 p.m.

#### RECENT PATENTS:

##### ABSTRACTS OF SPECIFICATIONS.

11,981.—VARNISH OR PAINT-CAN: *E. W. Barnaley*.—The receptacle which is the subject of this patent has some peculiar features. A bottle of ordinary construction is divided through the centre, and a wire handle is attached so as to form a paint-kettle; when this is turned over it forms a combined funnel and strainer. After use as a varnish or oil bottle, the parts are attached by heating the solder round the centre, and may then be utilised separately as bottles or receptacles for paint and varnish.

17,595.—FIRE-GRATES, STOVES, &c.: *J. R. Crosthwaite*.—Mechanical combinations relating to the arrangement of fire-bars are so placed as to enable the fire-grate or fuel basket to be adjustable to a greater or less capacity, according to the amount of warmth to be derived from the fire. The same stove can be used with an enlarged fuel capacity at one time and a diminished fuel capacity at another, being regulated by the person in control of its use.

19,038.—BOLTS FOR PANIC DOORS: *T. Jones*.—A disc or eccentric controls the movement of the bolts, and this so arranged that by one movement the bolts are withdrawn at need. A key is used to prevent the use of the apparatus without authority.

713.—BRICKS: *S. I. Adams*.—To form a better bond the brick is constructed with dovetail keyed frog extending through the width of both sides of brick. The mortar keys the bricks together, and the peculiar form of the frog or key ensures a thorough bond.

5,444.—CHIMNEY-POTS: *R. Baxendale*.—This is a slight modification of methods already in use. A casing is formed round the upper portion of the chimney-pot with a space between the pot and the casing. Grooves or recesses with inclined surfaces are added to deflect the air, and cause an upward and prevent a downward draught.

7,465.—OIL PAINTS: *A. Angel*.—Some alterations in the manufacture of "Polarite" and similar paints are described.

8,475.—ARTIFICIAL PLASTER OF PARIS: *J. L. Kerr*.—Utilises a residue of lime from ammoniacal manufacture. It is dried on a retort, till it becomes a powder, which may be used in the same way as plaster of Paris.

##### NEW APPLICATIONS FOR LETTERS PATENT.

AUGUST 13.—15,368, T. Martin and others, Brick Kilns.—15,369, J. Shaw, Automatic Down Draught Preventer for Ventilators, Chimney Tops, Soil Pipes, &c.—15,374, G.







## ILLUSTRATIONS.

Selected Design for the "Park" Infectious Diseases Hospital.—Mr. E. T. Hall, F.R.I.B.A., Architect .....Three Double Page Ink-Photo's.  
New Church of St. George, Worcester: Interior of Chancel.—Mr. Aston Webb, F.R.I.B.A., Architect .....Double Page Photo-Litho.

## Blocks in Text.

Diagrams illustrating article on the Planning of Public Libraries.....Pages 164, 166  
Sketches in Gloucestershire and Worcestershire .....Page 171  
Sketches, St. Paul's Church, Eastchester, New York .....Page 174  
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## Engineering Construction.



T is a curious as well as a melancholy fact, that the authors of nearly every book on the theory of engineering construction commence their preface by saying "In

undertaking this work my principal object has been to supply the want, long and universally felt among students of engineering and architecture, of a concise textbook on structures," and then proceed to write, chapter after chapter, on the strength of materials and such matters, as if they were the first to really bring these subjects to the notice of those about to enter one or other of these professions.

The "principal object" of the student is to choose the best, from the large number of books already written on the same subject, and the idea that he ever possessed "a long-felt want," for any more literature of this character, which only goes over the old ground again, is entirely erroneous.

If authors, therefore, before commencing to compile a treatise upon any engineering subject, would but ask themselves whether they are able to add anything that is new to the information that has already been published on that subject, the number of new books would be very much reduced, and at the same time their value would be greatly increased.

The literature we already possess on the theory relating to engineering structures is so exhaustive that to write a comprehensive work on the subject necessitates the restatement of those principles, already so ably explained by such well-known authors as Rankine, Stoney, and a host of others, who give in their books formulæ for determining the strength of girders loaded in every conceivable manner, and also for ascertaining their deflection under all possible conditions. The information regarding the strength of columns is practically the same in all these books, and yet it is given over and over again in every new work on constructional ironwork. We are first introduced to short columns, then to long columns, round columns and square columns, columns with fixed ends and with their ends free, until the attentive reader knows the family history of the whole species, even to

the minutest detail. In most books Euler's formulæ are next given, these affording an opportunity for introducing a page or two of differential and integral calculus, and even a differential equation. We have no sooner made our escape from the chapter on columns than we are brought face to face with the chapter on the theory of the continuous girder. This portion of the subject must always be looked forward to by mathematical authors, as here again the use of the calculus is most essential. After a few preliminary remarks we are again re-introduced to our very old and respected friend—

$$-EI \frac{d^2y}{dx^2} - M$$

the ultimate result of the close relationship expressed in the equation, being, of course, the theorem of three moments.

Now we were always of opinion that, notwithstanding the quantity of engineering literature, yet a book might still be written which would connect more closely the theory of the subject with every-day practice. We have seen students, after passing through one of the best engineering courses obtainable at any college in this country, during which they were thoroughly grounded in theory, unable, on entering an engineer's office, to make a drawing of a simple plate-girder that could be sent to the works to be constructed.

In nine cases out of ten, students on leaving an engineering college have no idea how the theoretical knowledge they have acquired is applied in practice. What they require to be taught on entering the profession is not how to obtain the stresses on the various parts of a structure, under every imaginable conditions of loading, but what to do with them when they have obtained them. When the necessary calculations have all been made, how are they to be translated into a working drawing of the structure that the contractor can work from? Such comparatively simple knowledge could, of course, be easily taught at any technical college, but it rarely is, because, as a general rule, the Professors are not practical men. The consequence of this system of education is, that after a student has gone through a long college course, and naturally thinks his knowledge has a certain market value, he finds after all it is necessary for him to enter an engineer's office, as a pupil, to learn his profession.

Now Professor W. H. Warren, the author

of the book\* which has suggested the title and substance of this article, has evidently appreciated the fact that a good deal may yet be written on the connecting links between theory and practice. The special feature of his book lies in the various examples, which are really working drawings, that illustrate the design of the most important classes of structures in iron, steel, and timber, all of which have been selected from existing works.

Of course, working drawings of various structures are often to be found in the pages of the technical journals, and in the proceedings of several engineering societies, but such generally appear without the detailed calculations upon which they are designed, and consequently, although valuable to the initiated, are almost useless to the student commencing the study of engineering.

The first of these examples given by Professor Warren is one for a wrought-iron plate girder bridge, of 62 ft. clear span, for carrying a double line of railway. He first states what is required, then proceeds to make his calculations, very much in the same manner as they would be made in an engineer's office, and finally gives the working drawing of the bridge, which is so complete that were it to be cut out of the book and sent to a contractor it could be constructed without any further information being asked for. Before leaving this bridge the author shows how "the quantities are taken out"; in fact, the student is shown the whole operation, step by step, from beginning to end.

The second example shows the method of procedure in designing an American steel truss bridge, with pin connexions, for a single line of railway. The span of this bridge is 220 ft., and here again the working drawing given in the book is excellent. The next example illustrates the construction of a three-span continuous lattice girder road bridge, supported upon iron cylinders. The necessary calculations are, in this case, of a somewhat more complicated nature, but they are all clearly given, and the working drawing of the bridge and its piers leave nothing to be desired.

To illustrate the design of a swing bridge revolving upon a central pier, the author gives four plates, which contain all the details of the structure, including the machinery, and six additional plates are

\* "Engineering Construction in Iron, Steel, and Timber." By William Henry Warren. London: Longmans, Green & Co. 1894.

given to illustrate the details of a three-hinged arch bridge, and a stiffened suspension bridge.

Now if this book contained nothing else than what we have already mentioned, it would still be one of the most useful works that a student could possess. As a matter of fact, however, it does contain a large amount of practical information, although, perhaps, too much space has been given to those subjects that are common to all textbooks of this character. In considering the strength and elasticity of iron, steel, and timber, the author explains the methods of testing specimens, and describes many of the experiments recently made, which have added so considerably to our knowledge of the physical properties of materials. Hardly sufficient prominence, however, has been given to that portion of the subject which deals with the size and preparation of the specimens of iron and steel which are to be tested. It is to be regretted that, at the present time, there is no generally-adopted form of test-piece used, the consequence being that specimens taken from metal of precisely the same quality may be made to indicate very different results when tested, since, in order to obtain from any sample of metal relatively high percentages of ultimate elongation, it is only necessary to modify the form of the test-piece.

The fact that short or thick test-pieces give a higher percentage of stretching than longer or thinner pieces, is well known, and to secure reliable tests, the length in which the elongation is to be measured, is, usually, although not always, stated. The width and thickness, however, of such specimens are rarely if ever specified, so that, in the hands of a skillful experimenter, the material could be shown to possess almost any degree of elasticity that might be required. In specifications for steel, such as is now used for bridge-work, it is generally stated that the breaking strength of specimens must lie between certain limits, and the elongation of the specimen tested must not be less than a fixed percentage measured in a length of 8 in.

The fatigue of metals, which Professor Unwin defines as the loss of power of yielding in the particles near the plane of weakness at which fracture occurs, is also considered by the author at some length. The experiments of Herr Wohler demonstrate that rupture may be caused not only by a steady load which exceeds the carrying strength, but also by repeated applications of stresses, none of which are equal to this carrying strength. This is confirmed by the exhaustive series of experiments made by Professor Bauschinger, who has shown that wrought iron which has an ultimate static strength of about 23 tons per square inch will fail after fifteen million repetitions of a load which only caused it to be stressed from zero to 13 tons per square inch, or the same number of applications of a load causing alternate tensional and compressive stresses of but 7 tons per square inch.

Sir B. Baker, during the construction of the Forth Bridge, made various experiments on the fatigue of metals. He found that when a shaft was loaded with one-half its breaking weight and set rotating, about 5,000 reversals of stress would produce fracture; and he also proved by experiment that the effect of repeated stresses is more prejudicial in tension than in compression.

In practice the fatigue of materials is more noticeable in machinery than in engineering structures, although in some parts of railway bridges its effects cannot be ignored. The Board of Trade rule for such structures is simply to limit the working stresses in iron to 5 tons per square inch in tension and 4 tons in compression; in steel bridges, however, the limiting stress is increased to  $6\frac{1}{2}$  tons per square inch. No experienced engineer would always work up to these limits. In some parts of the main girders he would feel justified in taking full advantage of the regulations, and adopting the maximum

stress allowed, but in other parts of the bridge, such as the cross-girders and rail-bearers, where the load is suddenly applied, he would not permit the working stress, per square inch, to exceed 50 to 75 per cent. of the above limits.

In America, where the magnitude of the bridges often allows of great refinements being observed, much more attention is paid to these matters than in this country, and very elaborate specifications have been prepared to govern the designs of important structures.

Much information will also be found in the pages of Professor Warren's book on the strength of timber, and the method of using this material for the construction of viaducts, trestles, piles, and for various other purposes. He also gives a *résumé* of all that is at present known regarding wind-pressure, and how its effect must be provided for under various conditions.

In our opinion, the student who will carefully work through the book will find, when he has mastered its contents, that he has an amount of knowledge that will secure for him remunerative employment in an engineer's office; and although this may not be the only object of study, yet at the present day it is one that can seldom be neglected, and we feel, therefore, justified in recommending a book that will lead to such a desirable result.

### THE PLANNING OF PUBLIC LIBRARIES.\*

By G. WASHINGTON BROWNE, A.R.S.A.

#### Lending Library.



WE now come to the Lending Library, the arrangements of which present various points of much interest, which are well worthy careful consideration. The nature of the work carried on in this department is nearly identical with that carried on in the telling-room of a bank, the matter changing hands being books instead of money; and I take it that the plan found by experience to be most convenient for the one business will be well adapted for the other. Thus, where a large amount of business is to be transacted, the model would be the telling-room in the head office of a bank; and for smaller business, the corresponding room in a branch bank. The former was the model adopted for the lending-room in the Edinburgh Library, and the librarian, after two or three years' experience, declares it to be a model lending-room, permitting the highest possible efficiency in service. Contrast with this the meagre, narrow, confined spaces, called "borrowers' lobbies," in many English plans, lobbies in which it seems to me physically impossible to carry on the work. Supposing the total number of daily applicants to borrow, renew, or return books, came in a uniform stream at regular intervals throughout the whole twelve hours during which the library is open, it might work well enough. But (and this is especially the case in industrial communities), the truth is they come in large numbers within the few minutes near the beginning and close of meal hours, and in the evening after tea, when hopeless crowding, with its resultant grumbling and disappointment, is inevitable.

The key to the whole plan of the lending-room is the indicator, that most useful of all appliances in a Public Library, saving the time and temper of the public and the staff alike, and enabling the work to be carried on with a smoothness and a quickness otherwise unattainable.

To the venerable Mr. Kennedy, a retired school-master in Dundee, belongs, I understand, the credit for the original conception of the principle of the indicator, and those invented by him are still in use in the Public Library in Dundee, though they have now become obsolete and generally superseded by the improved patterns brought out by Mr. Elliot and Mr. Cotgreave. Cot-

greave's is in use at the Edinburgh Library, and possesses, among its other merits, the advantage of being the most compact. The space within each frame is divided by thin metal plates into 4,000 small pigeon-holes, in each of which is a tablet bearing upon either end a number corresponding with that of a book upon the adjoining shelves. The number is printed in blue upon one end of the tablet, and in red on the other. So long as a book is on the shelf the corresponding number is displayed with the blue end of the tablet towards the public; the moment that book is given out to a borrower the attendant reverses the tablet, turning the red figure to the public, and as upon the frame of the indicator is printed the words "red is out" the public know not to apply for a book whose number is displayed in that colour. In issuing books no ledgers are required, the only entry being the number of the reader's ticket upon the small record-book incorporated with the tablet bearing the number of the borrowed book. In exchange for a book the borrower gives up his reader's ticket, upon which is written his name and address. This is deposited in the pigeon-hole along with the tablet bearing the number of the borrowed book, and remains there until the book is returned, when it is handed back to the reader. So long, then, as the reader's ticket remains in the hands of the librarian, it serves as a receipt for the book borrowed; while its possession by the reader is his proof that the book has been returned.

The total height of the indicator as used in ordinary practice is 4 ft., the net space occupied by the figured pigeon-holes being 3 ft.  $3\frac{3}{4}$  in. Its length is 15 in. for every 1,000 books recorded, and it is made in 5-ft. lengths, each length indicating 4,000 volumes. If these are arranged in pairs, which is probably the most serviceable and economical grouping, they occupy a length of counter of, say, 10 ft. 3 in.—allowing a trifle for some kind of wooden case to enclose the somewhat uncouth iron framework—10 ft. 3 in., for a record of 8,000 volumes. Now, experience shows that this is just about the number of volumes that one, or where there are a number, each attendant can serve from with reasonable speed. So that, for each 8,000 volumes, you require a service space which cannot be less than 18 in. or 20 in., and this space would probably be sufficient between the pairs of indicators if the applicants came at regular intervals all day long. But, as we find they come at certain hours quicker than they can be served, you have three four, or half-a-dozen people waiting their turn at each service opening at certain hours, just as you have at the ticket-office of a railway station a few minutes before the departure of a train. Now, if the indicators were placed close up to each side of the service openings, those persons waiting their turn would be standing in front of the indicator, completely preventing new comers from seeing whether the books they desired were in or out. Consequently, it is necessary to place the pairs of indicators at some distance apart, that they may always stand free for examination, and this distance cannot well be less than 5 ft. Now, 5 ft., plus the length of the indicators with their frames, 10 ft. 3 in. = 15 ft. 3 in. lineal of counter for every 8,000 volumes, which is exactly 23 in., or, as nearly as may be, 2 lineal ft. of counter for every 1,000 volumes in the library. This, then, is a most important and valuable factor; and no plan of a lending library can be considered satisfactory which does not provide something very near this proportion of counter space to the number of volumes shelved. As we shall see presently, under favourable conditions this may be reduced to a minimum of 20 in. per 1,000 volumes, but under the ordinary conditions of practice the higher figure will be found necessary. As the counter forms the barrier between the public and the staff, you must provide in front of it a sufficient space for your public coming and going and passing from one indicator to

\* Concluded from page 149.



**TABLE SHEWING**  
**NUMBER OF SQUARE FEET PER READER IN NEWS ROOM**  
**(NEWSPAPERS AND MAGAZINES)**

EDINBURGH	BRECHIN	CHELSEA	SOUTHAMPTON	ABERDEEN	MODEL A	MODEL B
N. 22 } 21 <sup>3</sup> / <sub>4</sub> M. 21 <sup>1</sup> / <sub>2</sub> }	12	20 } 17 <sup>1</sup> / <sub>2</sub> 15 }	18 } 20 <sup>1</sup> / <sub>2</sub> 23 }	—	—	—
AVERAGE (EXCLUSIVE OF BRECHIN)						20
LENDING ROOM						
TOTAL NUMBER OF VOLUMES ALLOWING 13 LINEAL FEET OF BOOKCASE AVAILABLE BY HAND FROM FLOOR LEVEL TO EVERY 1,000 VOLUMES						
48 000	8,000	24,000	24,000	40,000 32,000	72 000	88,000
NUMBER OF SQUARE FEET OF FLOOR AREA PER 1,000 VOLUMES						
88	77	73 - 78	83	84 105	58	48
AVERAGE (EXCLUSIVE OF ABERDEEN AS EXECUTED & MODELS)						81
LENGTH OF COUNTER IN INCHES PER 1,000 VOLUMES						
27	27	21	12 - 17	48 49	20	23 .
AVERAGE. (EXCLUSIVE OF ABERDEEN)						23

another with perfect freedom; and the absence of this free space is another of the conspicuous defects too frequently found in English plans; indeed the two defects of insufficient length of counter to accommodate the indicators, and inadequate space for the public in front of them, invariably go together, each being an inevitable accompaniment of the other. Behind the counter you must provide space for shelving books equal to 1,000 for every 2 ft. lineal of counter, besides free space for the attendant passing to and from the bookshelves, the service opening, and the indicator. Now you cannot get more than ten volumes in each lineal foot of shelf, taking the average all through, or twenty volumes per shelf in the 2 ft. of corresponding counter length, and, as the shelves average 10 in. from centre to centre in height, it follows that, to hold 1,000 volumes, you require the shelving 500 in., or 41 ft. 8 in. high, if it were ranged singly against the wall behind the counter, 2 ft. lineal of shelving and 2 ft. lineal of counter representing 1,000 volumes of books alike on shelves and in indicators, with their accompanying service openings. As this would be a ludicrous, not to say, impossible, height, the shelving is generally ranged at right-angles to the counter, between it and the wall, as at Edinburgh and Brechin, where there is a liberal allowance of counter space, or ranged in receding rows parallel to the counter, as in Chelsea and Southampton, where the counter-space is more restricted. A glance at these plans will show how much more efficient the service must be by the former than by the latter of these two methods.

The proper spacing of the cases from centre to centre, and the breadth of the shelves themselves, are next to be considered. As octavo is the largest size of volume that prevails in the lending department, a depth of 7<sup>1</sup>/<sub>2</sub> in. from front to back of shelves may generally be considered sufficient, and, as the cases are usually double, the books being inserted from two faces, we get a total

breadth of 15 in. The double shelving has rarely a back or division between the two fronts, as, when open right through, no corners are formed for the lodgment of dirt, the shelves are more easily and effectually dusted, while the free circulation of air is better for the books. The clear passage between two sets of bookcases should not be less than 3 ft. 6 in., which, with the 15 in. required for the shelves, gives a minimum from centre to centre of 4 ft. 9 in. In the original plan of Aberdeen the spacing is a trifle under 4 ft. centre to centre; in the plan adopted the spacing is increased to 4 ft. 6 in. In Chelsea and Brechin it is just a fraction under 5 ft., and in Southampton plan it is shown about 6 ft. 6 in., but would have to be closed up to get the necessary space for the public and counter; and in Edinburgh, where they take their spacing from the architectural bays of the room, they stand 6 ft. 9 in. centre to centre.

The height of the shelving above the floor should never be greater than that which permits the books upon the top shelf to be reached by a person of average height without the aid of steps or ladders, fixed or movable. All such expedients are objectionable, and result in injury to the books, and also to the shelving, and sometimes to the person, and should be avoided. The maximum height of the top shelf above the floor should be 6 ft. 6 in., giving a reach under 7 ft., and enabling the range of shelving, with its cornice, to finish within 8 ft. Within this limit of height you get eight rows of shelves, and, allowing ten volumes to the foot in each row, you require 12 ft. 6 in. clear length of shelving for every 1,000 volumes, or, adding 6 in. for the vertical supports and divisions, 13 ft. lineal of shelving accessible by hand from the floor, and 2 ft. lineal of counter length for every 1,000 volumes in the lending library.

Still adhering to the unit of 1,000 volumes, our next point of enquiry is—what area of floor space in superficial feet is necessary in the lending library to provide accommodation

for books and indicators, staff and public, upon the scale just laid down as necessary for efficiency?

I have shown on the accompanying table the proportions of storage room and floor area, &c., in the libraries I have selected as good types,\* and I find the floor space per 1,000 volumes wonderfully uniform all through. The figures are:—Edinburgh, 88 superficial feet of floor space per 1,000 volumes; Brechin, 77; Chelsea, 73, or, if corrected, as it ought to be, by squaring up the space for public, 78; Southampton, 83; and Aberdeen, as originally proposed, 84. This is not a wide divergence, the greatest difference, considering Chelsea to be corrected, being 11, and the average of the figures as they stand 81 superficial feet of floor space to every 1,000 volumes. Aberdeen plan, as executed, shows a much less favourable result—viz., 105 superficial feet per 1,000 volumes.

With the view of arriving at the maximum number of volumes it is possible under any circumstances to obtain in a lending library, while providing the requisite length of counter to place the indicators, and sufficient service openings to secure efficiency of service, I have prepared two plans of rooms, each having an area equal to that of the lending-room of the Edinburgh Public Library, viz., 42,000 square feet. I have arranged this area into a quadrilateral apartment of the most suitable proportions for each case. In the one instance, Plan A, I have assumed unrestricted light on all four sides, and have ranged the bookcases at right-angles to the walls, and restricted them in height as before, so that every volume is accessible by hand from the floor level. The space for the public is in the centre, and measures 42 ft. by 23 ft.—a good, free, open space. By this arrangement I obtain bookcase accommodation for 72,000 volumes upon the standard adopted throughout this paper

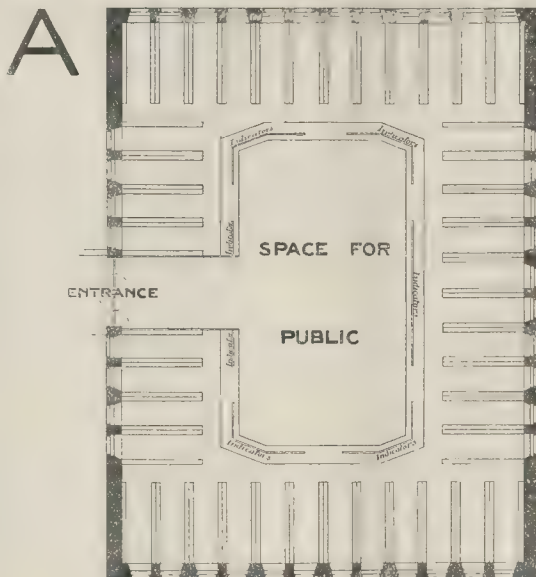
\* The upper portion of this table gives the proportion of space in News-rooms, referred to in the portion of the article published last week.—E.O.

of ten volumes per lineal foot of clear shelf, and eight rows of shelves in height. I obtain also 120 lineal feet of counter, measured along the line of indicators, giving accommodation for the requisite number of indicators, 18 at 4,000 each, and for six service openings of 5 ft. each; that is to say, one service opening with space for applicants standing clear of indicators to every three indicators. In the conditions already considered, I have taken one service opening for every two indicators, but the nearness of every book to the attendant under this plan would permit of quite satisfactory efficiency with one service opening to three indicators. A comparison of this plan with those of Chelsea and Southampton, will, I think, bear this out, yet both of these have but one service opening to every three indicators, so that a higher standard of efficiency would be obtained than in these two instances, though perhaps not reaching the ideal as at Edinburgh and Brechin. The space between the counter and the ends of the bookcases may appear little enough, but in the plan the counter is drawn 6 in. too broad. This 6 in. would be thrown into the passage, making it 3 ft. wide. The figures brought out by this plan, and shown upon the table previously given, are 58 ft. superficial of floor space, and 20 in. lineal of counter space for every 1,000 volumes.

In plan B I have worked upon the same superficial area of 42,000 ft., and have assumed no light obtainable from any of the sides, but the room entirely top-lighted. Under such conditions I have stacked the books in the centre of the room, three tiers high, under a glass roof (as at the British Museum), encircled the bookcases with the service and indicator counter, and placed the space for the public in the form of a continuous corridor or ambulatory, 10 ft. wide, between the counters and the enclosing walls of the room.

By this arrangement I obtain book-case accommodation for 88,000 volumes, allowing

## LENDING LIBRARY WITH BOOKCASES AGAINST WALLS

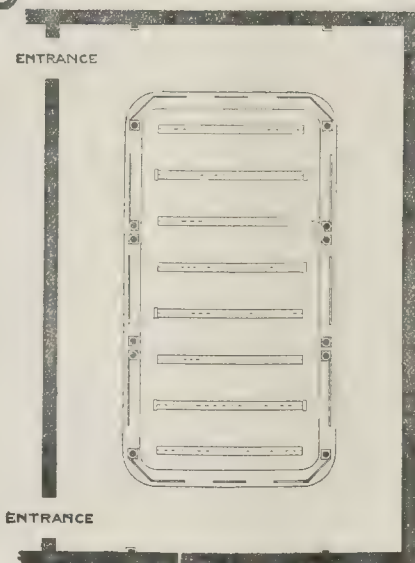


PLAN

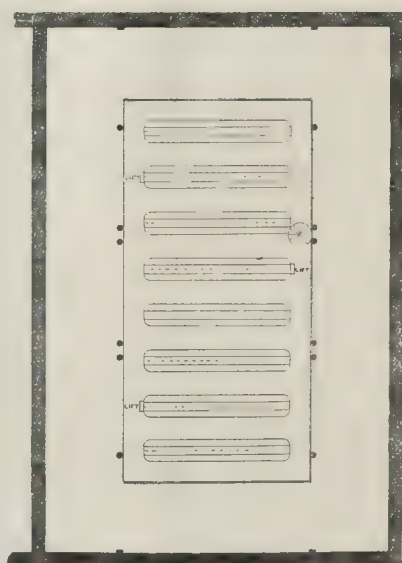
Scale of Feet 0 10 20 30 40 50 60

## LENDING LIBRARY WITH CENTRAL BOOK STACK

**B**



PLAN AT ENTRANCE FLOOR LEVEL



PLAN OF UPPER TIER OF BOOK SHELVES

Scale of Feet 0 10 20 30 40 50 60



to volumes per lineal foot of shelf as before, and taking advantage of three rows of shelves obtained under the counter all round. For this number of volumes 22 indicators are required, and at least half that number of service openings. The counter space obtained is 168 lineal feet, giving exactly the length required for 11 pairs of indicators at 10 ft. 3 in. each, and 11 service openings of 5 ft. each—one service opening for every two indicators, which, in such a plan, involving slower service on account of the time occupied in getting volumes down from the upper tiers, would be absolutely necessary.

The figures brought out by this plan, and shown upon the table, are 48 feet superficial of floor space, and 23 inches lineal of counter space for every 1,000 volumes.

In both these plans, by which such high results are obtained, I have considered myself wholly untrammelled as to dimensions and shape of ground, mode of access, means of lighting, &c.; indeed, in each case, I have made my own conditions as to surroundings, and, of course, made them the most favourable for my purpose. And while in neither case have I assumed anything either impossible or unreasonable, it would be but rarely that one would find oneself with so free a hand in actual practice. Consequently, the results so obtained are not the results to be expected in practice, but they may be advanced as the theoretical standard, towards which one's aim should be directed in practice, and below which one need only fall by the limitations of unfavourable or modifying conditions.

Another point of interest in connexion with lending libraries, though it may be said to belong rather to administration than to planning, is the classification of books under their general subjects. The usual classification is a vertical one, giving in one bay or division, say, Theology, in the next, say Science, then Art, and so on through History, Biography, Travel, Fiction, &c. You can see that such an arrangement in a public lending library would throw an immense strain upon those members of the staff who had the section of fiction, while those having law and theology might go to sleep half the day. This may be alleviated by increasing the number of attendants at the over-taxed service openings, but the attendants then get into each other's way. The true solution, and that which distributes the work equally among the staff and gives the most efficient service to the public, is the classification adopted by Mr. Morrison, the chief librarian at the Edinburgh Public Library, and originated, I understand, by him, viz., horizontal classification.

Here the several subjects, as Philosophy and Theology, Science and Art, History, Travel, and Biography, Fiction, and General Literature, occupy one or more shelves as their numbers require right round the library from one end of the bookcases to the other, and thus each attendant has a fair share of the work belonging to each section of literature.

I have dwelt at great length upon the lending library, because I feel it is the department that presents the most interesting problem in the planning of a public library, and is a department which is capable, with all its complexity, of being reduced to a few fixed rules, which I have endeavoured to establish, of floor space, counter space, and shelf space. These once established and recognised, their distribution and application to the varying conditions of site and amount of accommodation required are matters of detail, which the ordinarily skilful architect will successfully apply to each case he is called upon to deal with.

**Reference Library.**—The conditions surrounding the reference library are so varied, ranging from what is apparently a single book-case in Brechin up to a maximum whose limit is set only by the sum of the world's literature, that I do not propose to attempt the task of reducing its requirements to fixed standards, as I have

done with the news-room and lending-room. The first important question that confronts us, in considering the reference library, is that of the housing of the books. Shall they be housed in the reference-room or in a separate book store? The old time-honoured method is to have them in the reference-room, the newer method is to stack them in a store behind. The latter is probably the more scientific method; but, as in the matter of house-warming, one's sentiments cling to the old unscientific open fire, so also one's sentiments cling to seeing the books upon the shelves in the room, public or private, which we call a library. There is certainly an educative influence, combined with an incentive to further reading, excited by the presence of the volumes around one which would be lacking were they absent from the walls, and to stimulate the desire for further knowledge is not the least among the missions of the Public Library. There is the wall space ready to hand for storing books, and I know of no good reason why it should not be utilised for this purpose. I think, probably, a combination of both methods is good, and in process of time both will become necessary. Public reference libraries, as we are considering them, are yet in their infancy, and who shall say to what proportions they may not grow. Once the reasonably available wall or other space within the reference-room is occupied, and a receptacle to receive the overflow becomes necessary, it is expedient that the receptacle be a properly constructed and lighted book-store, and not a dark, dingy, and inaccessible cellar or attic. This has been done in the British Museum Library. The great rotunda, used as the reading-room, is lined with book-shelves right up to the springing of the dome, and beyond the circular walls are the great stores, constructed as I have already explained. So, in Edinburgh, the solid walls in the arms of the cross, and the spaces between pillar and pier, are set off in book-cases, three tiers high, with access galleries reached by the enclosed circular stairs in the angle piers; but the plans provide for a book-store, constructed as at the British Museum, to be erected as an extension whenever the necessity may arise. At Chelsea, the original plan of having book-cases in two tiers with a gallery round the walls of the reference-room, was abandoned, and the books were stacked at once in the store behind.

In whichever place the books are kept, a standard different from that of the lending library must be adopted in calculating the shelving necessary to accommodate a given number of volumes. The publications found in a reference library range in size from the *bijou* 32 mo. to the stateliest folio, and in thickness from the lean and slender pamphlet to the corpulence of the omnivorous encyclopædia. Upon an average, one cannot count upon more than seven and a-half volumes per lineal foot of shelf, while the height will average one shelf to the foot—that is to say, that while in the lending library you may reckon upon twelve volumes per superficial foot of shelving frontage, in the reference library you cannot reckon upon more than seven and a-half, or, at the outside, eight volumes in the same space. In other words, within a given superficial frontage of book-case, the number of volumes pertaining to a reference library that could be shelved would be, to the number pertaining to a lending library that could be shelved within the same frontage, as two to three.

The tables in the reference library should be single, not double, so that the readers sit at one side only, and all face the librarian's desk. This affords opportunity for better surveillance, and checks the depredations of the book-ghoul. An allowance of not less than 2 ft. 6 in. should be made for each reader at a table. This is the allowance given in some of the best English libraries as Leeds and Birmingham, and was adopted at Edinburgh. The British Museum reader has the princely allowance of 4 ft. 2 in. The single tables are 2 ft broad, and should be

spaced 3 ft. apart. Short tables are preferable to long ones, and special tables, somewhat broadened than the single ones, should be set apart for the use of accredited students reading up a special subject for which they may require several volumes at a time for cross reference. The alcove principle for planning a reference library, besides offering the amplest opportunities for shelving within the room, affords also excellent bays for the accommodation of the special student beyond the central floor space occupied by the general readers.

There are other points of considerable importance in their relation to the "life" of books, readers, and staff, which call for careful consideration in the planning of Public Libraries—such as lighting, heating, and ventilation—which I cannot close this paper without a passing reference to, though I shall confine myself to a single sentence upon each.

On the general question of lighting, natural and artificial, one would say, carry out the injunction contained in the quotation Mr. Carnegie inscribes over the doorway of every Public Library he builds—"Let there be light." In natural lighting a top-light, where obtainable, has many advantages. It is the nearest approach to external lighting that can be obtained within a building. It is admitted to be the best light for seeing paintings in, and it cannot be a bad one for seeing books in. For artificial lighting, the electric light should be adopted wherever obtainable, for reasons which it is hardly necessary to discuss.

Regarding heating and ventilation, one might paraphrase the old proverb and say, "Take care of the ventilation and the heating will take care of itself." I have been in many libraries that were over-heated and lacked ventilation, but I never was in one that was over-ventilated and lacked heating.

#### NOTES.

**T**HE Scotch coal strike is not yet at an end, although, as the result of the ballot to which we referred last week, the men have declared themselves in favour of a compromise. The majority was only 4,475 on a total poll of 46,359, and it must be remembered that the vote was not upon an offer of the masters, but upon a suggestion from an outside body. Still, the fact remains that a majority of those voting have registered their willingness to forego half their original demand, and this should certainly facilitate a settlement. There is a "rider" to the resolution which the Scotch coalowners doubtless object to, viz.—that if the sixpence advance be given, it shall be guaranteed for two years. The masters do not seem much inclined at present to grant the 6d., or to make any concession at all, and they are therefore hardly likely to consent to bind themselves in the manner suggested. The men, generally, are determined not to resume work on the old terms, or to permit those who would; and bad feeling is being engendered, which is causing much uneasiness and apprehension. At some of the pits where the men are willing to work, they are confronted by the "peaceful picket" with the usual methods of persuasion, and some rather serious encounters have taken place this week.

**I**T will be anything but reassuring to nervous passengers to read Major Marindin's report of the recent buffer-stop smash at St. Pancras. The report amply confirms the opinions expressed in these columns regarding the cause of the accident, and cannot but tend to somewhat shake public confidence in this generally well-managed line. The driver trusted to the continuous brake-power to pull up before reaching the buffer-stops, although forbidden by the rules of the company to enter a terminus at a speed higher



than a hand-brake stopping speed. Moreover, 'that this is systematically done is, says the report, "a notorious fact." Here is a rule involving the safety of passengers observed, apparently, in a precisely similar manner to that relating to tips. It seriously weakens the value of the whole book of rules, as safeguarding the travelling public, if one of such importance can be "notoriously" disregarded with impunity. It is well for the company that they escaped as they did, although they will quite likely find that they have lost some of their competitive passenger traffic, in addition to the money out-of-pocket for compensation.

THERE seem to have been an unfortunate number of hotel fires at summer resorts of late. Two reports reached us from Switzerland alone last week—one from St. Moritz, and the other from Beatenberg. To anyone who has watched some of the Swiss Hotels being constructed, and has noticed the dearth or inefficiency of the extinguishing apparatus in this class of building, the disasters must seem wonderfully few. It would be in the interests of the Swiss if their Government were to enforce some preventive regulations, as a list of casualties would probably at least temporarily prevent many from sleeping in these dangerous match-boxes. Since the introduction of lifts even staircase accommodation is getting scarce in the Swiss hotels, and a night panic would be most disastrous. In these buildings the least that could be done would be to supply rope-ladders and shoots for life-saving purposes. Safe hotel plans require no room to be farther from a staircase than 60 ft., and they must be so planned that in case of one exit being blocked a second can be found. As to extinguishing gear, buckets and small hand-pumps generally do the best service in risks of this kind. So-called "grenades" and "extinguishers" are unreliable.

SOME two years back two enterprising architects at Stuttgart commenced issuing regular illustrated reports on the leading architectural competitions held in Germany. The complete sets of drawings of the successful competitors were published, and a selection made from the sheets of the less fortunate contributors. A plan of the site, the competition regulations, and the assessor's remarks were added, and the whole formed an invaluable record, especially for those who wished to benefit from their competition efforts, but had no opportunity of seeing the work exhibited in the usual way. Now the same architects have commenced publishing a Competition Gazette in connexion with their illustrated journal. All competition news, rumours, correspondence, &c., will be found room for in its pages, and there will be criticisms on the competition work from well-known pens, besides the report of the assessors. The unwary will be warned of the ways of the questionable competition promoter, and the tricky "programme" will be carefully analysed for the benefit of rash, would-be competitors. As this enterprise is in good hands it will, no doubt, be exceedingly useful and the standard of competitions will be raised. There is quite scope enough for a Gazette of this kind in Germany, where the number of competitions is always very great.

THE final report of Mr. Little, the senior Assistant Commissioner of the Labour Commission on the condition of the Agricultural Labourer which has recently been published, undoubtedly shows that the housing of the agricultural labourer has not improved in an equal degree with his food, education and position generally. It is also noticeable that it is on the estates of the great landlords, who are among the best-abused people of the day, that the best

cottages are to be found. The agricultural labourer is in truth somewhat careless about the state of his dwelling, and the result is that where there is not a public-spirited landed proprietor desirous of having his cottages in a sound and habitable state, the cottages are often not up to the mark, chiefly for the reason that the labourer is content with a bad dwelling. He does not set sufficient value on sanitary matters and material comfort so as to avoid cottages which are of an inferior character. It is only fair also to add that in many places the labourer has not a choice between a good and a bad dwelling. He must live within a reasonable distance of his work, and within that distance comfortable and healthy cottages are not always to be found. Here we find the need for greater energy and zeal by the rural sanitary authorities. Undoubtedly many of these bodies are very neglectful of their duties; their inspectors do not look about the country with any system or care, and the authorities do not endeavour to carry out the law. However, public opinion on the subject of the housing of the working classes in rural districts must be aroused; it is a question not only of comfort but of health.

WE have before us, in a pamphlet form, a special report on what is called the "Scott Moncrieff System for the Bacteriological Purification of Sewage." Briefly, the system is founded on two biological changes, fermentation (and putrefaction is a kind of fermentation), and nitrification. A century ago it was discovered that the putrefaction of organic matter was due to bacteria. These are now known to be vegetable organisms (schizomycetes), whose energy is displayed in decomposing nitrogenous matter, and consequently in producing free ammonia. The second change, namely, nitrification, was, until, about seventeen years ago, believed to be of a purely chemical nature, but it has since been demonstrated that this, too, is due to micro-organisms, which act on the "free ammonia" in the presence of a salifiable base (such as lime, soda, &c.), and convert it into harmless inorganic nitrites and nitrates of that base. It is evident, although he does not say so, that Mr. Moncrieff's system is merely an attempt to put into practice the ideas expressed by Mr. Robert Warington in his paper read before the Society of Arts in 1882; we cannot do better than quote Mr. Warington's own words:—

"Sewage also contains the organisms necessary for its own destruction, and under favourable conditions these may be so cultivated as to effect the purpose. A filtering medium of pure sand and limestone, treated intermittently with sewage, will, after a time, display considerable purifying powers, the surfaces becoming covered with oxidising organisms derived from the sewage. No such medium will, however, equal in effect a porous soil rich in organic life."

Mr. Moncrieff's partial application of these ideas consists of a "Cultivation Filter-Bed" made up of layers of flint, coke and gravel (of a total depth of 14 in.), through which the sewage filters upwards; and of a "Nitrifying Channel" filled with coke, along which the effluent from the filter-bed passes for further purification. The experiments carried out by Mr. Houston showed that the filter increased in efficiency for a certain length of time, as Mr. Warington predicted, but afterwards deteriorated somewhat. In consequence of this, Mr. Moncrieff modified his plans by using two filter-beds and channels to allow for alternate aeration; this necessity of intermittency was also pointed out by Mr. Warington. But after all, the final effluent, although much improved, was far from pure; eight analyses showed that on the average no less than 0.64 grains of albuminoid ammonia remained in each

gallon of effluent, nearly 50 per cent. more than Sir Henry Roscoe found in the effluent of London sewage after treatment by electrolysis. Mr. Houston's analyses, however, were made in mid-winter, a most unfavourable time for the development of bacteria. It appears probable, too, that the household sewage, on which his experiments were made, was much more concentrated than the London sewage, but no analysis whatever of the crude sewage is given, and no accurate idea of the purification effected by the process can therefore be formed. This is a weak point in the report. We are of opinion that a greater depth of filter will be found necessary, and that the best results will be obtained by allowing each filter and channel to have some hours' rest every day, instead of dosing them continuously for two or three weeks. We trust that Mr. Moncrieff will proceed with his investigations, for it appears probable that his system may be so modified as to prove really useful, seeing that its aim is to work hand-in-hand with nature, and merely to accelerate her process of purification by multiplying her innumerable army of minute scavengers.

AN interesting paper in the new issue of the Athenian *Mittheilungen* (1894, XIX.), is devoted to the fragments of sculpture from the Temple of Asklepios at Epidaurus, which are in part presumably from the hand of Timotheos. Up to the time of the excavations at Epidaurus Timotheos was known to us only from some late Græco-Roman copies of his works, and as one of the four sculptors who decorated the Mausoleum at Halicarnassos, the others being Scopas, Bryaxis, and Leochares. The Epidaurus sculptures are of special importance, because we know from an inscription dealing with the building of the Temple of Asklepios, and found *in situ*, that Timotheos made the models for the entire sculptural decoration of the temple, and, in addition, executed the figures for one of the pediments with his own hand. It is unfortunate that we are not told which pediment—east or west. The fragment selected for publication is a Nereid seated on a sea-horse, and side by side with it Dr. Winter places the Leda and the swan of the Capitol, a reputed copy of a work by Timotheos; the analogy in pose, proportions of the figure, treatment of the drapery, will not escape the most superficial observer—and the differences are just those of weakening and exaggeration that will be expected between an original and the work of a copyist. The head of the Nereid is, unfortunately, lost; but some of those from the west pediment are preserved, and are closely analogous to the Leda head. No less remarkable, too, are the points of comparison with the Nike balustrade on the one hand and some of the slabs of the Mausoleum frieze on the other. Altogether the Epidaurus fragments promise to throw a flood of light on the school of the younger contemporaries of Scopas and their relation to their predecessors.

THE eminent German archaeologist Professor Curtius celebrated his eightieth birthday on Sunday last, and has been the subject of many complimentary ovations from all parts of the world. A number of admirers subscribed to a memorial in form of a bust of the *savant*, which has been placed in the vestibule of the new museum at Olympia; and the Emperor, we understand, has given the learned archaeologist a much-prized distinction. Professor Curtius first visited Greece as secretary to the late Professor Brandis. This was in 1837. In 1841 he returned to Germany, and soon after held a post as demonstrator at the Berlin University. A professorship followed, and then in 1844 he was engaged as tutor to the late Emperor Frederick, who was studying at Bonn. In 1850 he took up his old post at Berlin, but temporarily left it in 1856 for a chair at

\* "Report upon the Scott Moncrieff System for the Bacteriological Purification of Sewage." By Alexander C. Houston, M.B., D.Sc. Edinburgh. Published by Waterlow Bros., Ltd., London.



he Goettingen University, returning to the capital again in 1868 as Professor Boeckh's successor. After 1870, thanks greatly to his influence at Court, he was able to do much to encourage archaeological research among his countrymen. He practically started the German Archaeological School at Athens, and organised the Olympia excavations (1875-1881). It would lead too far to notice his many valuable writings. His "History of Greece," "The Excavations at Olympia," and his "History of Athens" are, we believe, the most appreciated. As an orator his name still ranks first throughout Germany. As a University teacher he is very popular.

ACCORDING to custom, the biennial gathering of the German architects was again preceded by a business meeting of the delegates of the numerous architectural societies which, together, form the *Verbund*, or Union. Much valuable research work was reported on, and a number of new subjects arranged for discussion. The reports of the various bodies in fire-resisting instruction have not yet been edited, but a *résumé* is promised for next year. Similar reports are to be collected on the salting of bricks, and the preventive measures lately introduced in various German brickfields. The Union has now practically decided to have its own burial, and there is some talk of the well-known *Transactions* of the Hanover Architekten-Verein being remodelled to answer its purpose. The new journal will appear monthly. The Union is growing rapidly, as thirty-eight societies with 7,050 members now take part in the work. Herr Baurath Finckeldeyn has been re-elected President, Herr Pinkenburg is the Honorary Secretary. The annual expenses of the Union are about 600*l*. The next biennial gathering will be held at Berlin.

THE terrible catastrophe of the forest fire in America, the worst that we remember of a long list of similar disasters, seems to make it a duty imperative on the United States Government to take some decisive steps, at whatever cost, towards obviating the possibility of such terrible recurrences for the future. A solitary settler here and there in the midst of a forest might be expected to take the risks of his situation, but it seems absolutely wrong that towns of considerable number of inhabitants should be allowed to remain exposed to the possibility of being burned up wholesale by the accidental firing of a forest in dry weather. There ought to be a legal enactment compelling the formation of safety zones of clearance round such towns, or possibly that of alleys of clearance isolating different portions of the forest country, so as to keep fire within limits. The latter might, however, be too large an undertaking; but the safety zone round a town seems to be a practicable scheme, and if so, it certainly ought to be rendered compulsory by legislation.

#### MAGAZINES AND REVIEWS.\*

In the *Art Journal* an article on domestic architecture in Norfolk, by "Z," gives a sympathetic and appreciative notice of a few of the best examples of the fine old brick houses of East Anglia, with woodcut illustrations of small size and no great excellence. The houses dealt with are Oxburgh Hall, Middleton Towers, East Barnham, Great Hautbois, and the vicarage and farmhouse of King's Lynn. The picturesque courtyard of Oxburgh and its wealth of old furniture and embroidery might surely have claimed at least passing mention. A third article on "The New Sculpture" is continued by Mr. Edmund Gosse.

\* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

The *Magazine of Art* contains the first part of an interesting article on the pavement of the cathedral at Siena, under the title of "The Wonder at Siena," by Mr. Lewis F. Day, in which he deals with the work in the chronological order of its execution, and from that explains its apparently mad confusion. The author's drawings in illustration add to the value of the article, which his attempts at humour do not detract from. The recent "International Exhibition of Book-bindings" at the Caxton Head is the subject of a critical notice by Mr. Will. H. Edmunds.

The sketching ground in the current number of the *Studio* is "Shrewsbury" whereof, and its fruitfulness in subject, Mr. C. G. Harper gives a sufficiently enticing account, not omitting mention of such neighbouring spots of interest as Ludlow, Bromfield, and the ever-delightful Stokesay, of which a pleasant sketch is given amongst other illustrations. Recent designs by Mr. Herbert S. Pepper form the basis of an article entitled "A New Designer for Metal-Work," by Mr. Edward F. Strange, whose enthusiasm leads him to somewhat over-rate the originality and ignore the mannerism already apparent of even this new designer, as shown by the illustrations given. The article "On Gesso, and some Designs in a Competition for a Finger-plate," by Mr. Matthew Webb, is useful in its criticism of what is and what is not suitable design for gesso, and with its hints on treatment, a valuable addition to the excellent article by Mr. Walter Crane in a former number.

The *Antiquary* continues its series of "Notes on Archaeology in Provincial Museums" with a description of the principal objects of antiquarian interest in the museum at Northampton, written by Mr. Roach le Schouix. The address delivered (as President) by Sir Henry Howarth at the recent Shrewsbury meeting of the Archaeological Institute is printed *in extenso*, and is well worth careful reading as an exposition of the fundamental principles of archaeology, or, as the title expresses it, "The Methods of Archaeological Research."

The *English Illustrated Magazine* gives us an article by Major Ricketts on the charmingly picturesque mansion, five miles from Maidstone, known as Leeds Castle, though it is scarcely strictly correct to call it "The Moated Castle of Leeds," as it is rather a castle in a lake, and the greater part, even so, dates no further back than 1822. Several sketches give a fair idea of the picturesque character of the house and its surroundings, though its greatest charm, that of colour, is necessarily absent. "Memories of Prato," by Mary F. Robinson, is an interesting account of the little Italian city, with some excellent illustrations of the cathedral and the pretorial palace.

The *Gentleman's Magazine* contains a gossip article on "Diocletian's Palace at Spalato," by Mr. Percy Fitzgerald, chiefly made up of excerpts from the writings of Robert Adam, T. G. Jackson, Lady Strangford, and Sir Gardner Wilkinson; well adapted, therefore, to excite the interest of those to whom the existence of Diocletian's magnificent home is almost unknown, but of little value to those who would wish to know something definite of the architecture of this interesting example of Roman architecture of the later Empire.

In the *Fortnightly Review* there is an account of "The Work of Mr. Pater," by Mr. Lionel Johnson, well worth reading for a description of the writer whose work is justly to be highly esteemed, whether as artistic literature or as valuable criticism on many and varied forms of artistic work. We find also an article on "The Museums of Paris," by Mr. Frederic Harrison, which contains wholesome instructions for our municipal rulers and guidance for our students who aspire to be "professors of plaster and brick," even though they be flouted by the author's somewhat unnecessarily reproachful term, "*genus irritabile structorum*."

The *Pall Mall Gazette* has a topographical paper on "Westminster" by Mr. Walter Besant, which in its present Chapter I. brings the history of the city without citizens to the time of King Canute the Dane.

In the *Nineteenth Century* articles which may have interest for our readers are to be found in the conclusion of Prince Kropotkin's "Mutual Aid in the Mediæval City;" and a reply to "Mrs. Sydney Webb's Attack on the Labour Commission," by Mr. Geoffrey Drage, secretary to the Commission.

Major C. R. Conder, in his article on "Palestine Research—Past and Future," in the *Contemporary Review*, summarises what has been done, and speculates on what may be done, in the way of exploration in the Holy Land, especially

emphasising the importance of the investigations amongst the evidences of Hittite activity.

The article on "Playgrounds for City Schools," by Mr. Jacob A. Rüs, in the *Century Magazine*, is an astounding revelation of the utterly insupportable condition of too many of the public schools of New York, which is surprising in the extreme, and shows a callous indifference to the actual existence of her youthful citizens, which is but too general in America, where, it must be feared, the conditions of life for the "masses" are often far harder than can well be paralleled in this effete old country.

*Scrimer's Magazine* has an article on "The Tapestry of the New World," by Fanny D. Bergen, which attempts to reduce to something like system the favourite designs of patchwork quilt-makers, some of which seem to have remained in vogue from fifty or sixty years ago to the present time, and whose ancestry might doubtless be traced through "Colonial" days to the still older traditions of the mother country.

*Harper's Magazine* shows that Japan and all things Japanese are still reliable fetich with which to attract the American public, by the inclusion of a paper on "Early Summer in Japan," by Alfred Parsons, excellently illustrated and eminently readable. More sterling in educational value is the article on "Some Records of the Ice Age about New York," by T. Mitchell Prudden, pointing out how visible even to-day are the evidences of the great glacial epoch, when North America north of the parallel from San Francisco to New York was covered with ice fields.

Members of the Hellenic Society may be recommended to read Mr. Andrew Lang's witty and good-natured banner in *Longman's Magazine*, under "The Sign of the Ship," on the manner in which speculations on points of Greek archaeology are sometimes carried on now-a-days. The satire is not uncalled for. In the same magazine is the concluding number of Mr. Trevor-Battye's "White Sea Letters," which contains some interesting information as to Archangel and other localities of the neighbourhood.

*Cassier's Magazine* deals with American engineering in a series of articles, readable by the laic as much as by the professor, and dealing with such diverse subjects as "The Ferryboat of To-day," "Modern Lighthouse Service," "First Stationary Engines in America," "The Earliest Ironclad," "Refrigeration from Central Stations," "The First Steam Screw Propeller Boats," "Biography of Dr. Henry Morton," and "The Ideal Preparatory School for Engineering Students," pleasantly written and excellently illustrated.

#### THE TRADES' UNION CONGRESS.

The twenty-seventh annual Trades' Union Congress opened on Monday at Norwich, when Mr. F. J. Delves was elected President.

The Parliamentary Committee's Report, presented by Mr. Charles Fenwick, M.P., contained the following passages:—

##### Federation of Trades.

"The instruction given to us by the last congress, to prepare a basis of federation for the purpose of bringing all trades and labour organisations into closer touch and sympathy with each other, is one which has been considered by several previous congresses. Only four years ago the Parliamentary Committee carefully considered the question, and prepared a code of rules which were submitted to the trades, but without any result following therefrom. The committee at that time were of opinion that 'a federation, to be really powerful, should be exclusively composed of trades already organised on a sound financial basis, capable of successfully grappling with any ordinary difficulty, and only needing the assistance of the federation in cases of great emergency.' We have thought it desirable to reproduce the rules prepared by our predecessors in office, copies of which will be supplied to each delegate attending the congress.

##### Labour Commission.

The final report of the Labour Commission was presented to Parliament in June last. It is scarcely necessary for us to say that the Commissioners are hopelessly divided in their opinions on almost every question of importance that came within the scope of their inquiry. We have, therefore, nearly as many reports of one kind and another as there were members on the Commission. Your committee clearly foresaw this difficulty at the time when the Commission was appointed, and entered a strong protest against the overwhelming balance of representation given to









Sketches in Gloucestershire and Worcestershire, by Ernest C. Bewley.

and now, with the exception of the banquetting-hall, it is mostly inhabitable.

No. 2, at Broadway, is a fine example of a house of the early part of the fourteenth century, with later additions of the fifteenth. The earlier part of the house contains a small hall with good oak roof, a solar, and a very small chapel on the upper floor, lighted by a traceried window of two lights. It is built of the local stone, which, toned by age, is of a lovely colour, and covered with stone slates.

No. 3 is an example of many that might be given of interesting stone houses and cottages for which Broadway is so justly celebrated. The detail in most of these houses is very good and refined, and their charm is very much enhanced by the picturesque way in which they are dotted about the long, wide, and straggling village street.

No. 4 is a very fine stone house at Aston Subedge, adjoining the church, L-shaped in plan and more interesting externally than internally.

No. 5 is a Lodge at Chipping Campden, and what was Campden House, a very much illustrated and described mansion which was burnt down, only a few picturesque ruins now remaining.

No. 6, a "Smithy" at Chipping Campden, is not of any architectural interest, but noticeable in this district, where all stone cottages, almost without exception, are roofed with stone slates, for its thatched roof of exquisite colour.

ERNEST C. BEWLEY.

#### COMPETITIONS.

**PUBLIC HALL, CLEETHORPES.**—The competition for a Public Hall at Cleethorpes, Lincolnshire, has just been decided as follows:—First premiated design, Mr. John R. Withers, St. Mary's-court, Shrewsbury; second, Mr. Solomon Ford, 3, Queen-street, Cheapside, London, E.C.3; third, Mr. J. Mitchell Bottomley, 28, Albert-road, Middlesbrough.

**DEVON VOLUNTEER COMMEMORATION.**—On the 31st ult. the Devon Volunteer Commemoration Committee held a meeting at the Exeter Guildhall, under the presidency of the Mayor, for the purpose of further discussing the designs submitted to them. The designs under consideration bore the mottoes "Exon," "Jan Ridd," and "Fortiter." The majority of the votes were given in favour of the design "Exon," and on the sealed envelope being opened it was found that the author of this was Mr. S. K. Greenslade, A.R.I.B.A., of University Hall, London. Mr. Greenslade enclosed, under cover, a tender from Messrs. H. Hems & Sons, Exeter, who undertook to carry out the work and erect

the memorial to the satisfaction of the committee for the total sum of 200l., including architect's charges. The committee resolved to adopt "Exon's" design, subject to the City Council assenting to its being placed on the Lower-terrace, outside the Assize Courts, on Northernhay. The memorial takes the form of a pedestal raised on two steps, and surmounted by a square shaft, having a cap with the Royal Crown as a terminal. There are four panels. On one is the profile of Dr. Bucknill in high relief, and on the other panels inscriptions are to be inserted. Above the panels are medallions in which will be inserted the figures 1852, 1894, the monogram "V.R.," and the City Arms. The memorial will be over 20 ft. in height. The premium of 5l. was awarded to the author of "Fortiter," subject to the provision that the Council assent to "Exon's" memorial being erected as proposed. This design was the work of Messrs. J. Whitehead & Sons, of Aberdeen.

\* \* We cannot accept any statements of the result of competitions except from public announcements or from official communications.

**THE GLASGOW SCHOOL OF ART.**—The results of the examinations and competitions in connexion with the Science and Art Department received for this school, says the *Glasgow Herald*, show that the past session has been very successful, the school fully maintaining the high position it holds amongst the schools of art of the United Kingdom. In the national competition 32 medals and Queen's prizes have been received, being 11 more than last year. These comprise 1 gold medal (out of 9 granted to the whole kingdom), 2 silver medals, 14 bronze medals, and 15 Queen's prizes. The gold and silver medals, together with 4 bronze medals and 5 Queen's prizes, are awarded for architecture, 7 bronze medals and 1 Queen's prize are given for design, 2 bronze medals and 8 Queen's prizes for modelling, and a bronze medal and Queen's prize for life drawing. Three national book prizes are also awarded for the special excellence of individual sets of works. Thirteen free scholarships of the value of 3l. each have been granted to artisan students of the evening classes. In the advanced local examinations 640 passed (283 first class and 357 second class) are registered. Of the six students submitted for the three days' architectural design examination, two passed excellent, three passed first class, and one second class. The "Haldane" scholarship, value 50l., was awarded for the seventh consecutive year to the school. The "Alexander Thomson" scholarship of 60l. was also gained by a student, as also a Royal Academy three years' studentship in architecture. Eight students have obtained situations as designers, teachers, &c., through the agency of the school.

#### SKETCHES IN GLOUCESTERSHIRE AND WORCESTERSHIRE.

THE first sketch is of a very fine ruined Tithe Barn at Sudeley Castle, a large house, for many years left in a very ruinous state, but restorations were very judiciously made by the late owners,



## Illustrations.

## THE "PARK" HOSPITAL.

**WE** publish this week the general plan, and the details of two classes of wards, of the accepted design for this hospital, by Mr. Edwin T. Hall. As we consider it an exceptionally well-planned building of its class, and one in which the details have been very fully considered, we give the architect's descriptive report nearly in full:—

## "REPORT, SPECIFICATION, AND CLIMATE. Block Plan.

The problems presented to architects in designing this hospital were how to conveniently dispose the various buildings on a very irregular site varying in level from north to south 31 ft. and from east to west 23 ft. with the necessary condition of avoiding steps in the various channels of communication on the ground floor.

In this design the author submits to the judgment of the Board his solution of these problems.

Speaking of the scheme generally, the author wishes to submit that he has paid great attention to the architectural grouping and treatment of the whole.

While avoiding any outlay that can for a moment be classed as extravagant, an endeavour has been made in the composition to attain quiet dignity and reposefulness with pleasant detail, and with these ends in view it has been sought to retain, as far as possible, the surrounding trees, which on sanitary grounds are desirable. It may be noted in this connexion that the superintendent's house has been placed in part of the pleasure garden of the old house.

The composition, then, consists in a group of picturesque buildings by the entrance to the right, mostly of one story, between which the road leads to the centre block. In this position a three-storied building, with recessed front and flying gables, terminating in a wavy skyline, screens from view the less interesting business department of the administration. Well in advance, and at the foot of this, is a one-story block, studiously plain in design, which serves to give scale to the residence itself, while high above it, to the rear, is the clock and water-tower, with its steep roof.

Right and left at wide intervals range the eight pavilions, which face towards the road, terminated by their apparently-detached towers, which serve to emphasise the whole design.

Dealing with the question of levels, the author has fixed, on a level floor to the main corridor, the full width of the central group of buildings. From this level easy gradients follow the general rise or fall of the ground in various directions. As the main corridor is connected with pavilions, which are necessarily different in level, an arcade cloister treatment is given, the curved lines carrying the eye from one block to the other without offence.

This corridor, which from end to end of each group of pavilions carries the airing balcony for first-floor wards, is, between the groups, kept down to a height of about 10 ft.

Convenience of access being of importance, the entrance gate has been placed at the nearest point to the main road from London. The gates open into a roadway 30 ft. wide, and are flanked on the one hand by the porter's lodge and residence of the medical superintendent, and on the other by the block for discharge of patients, while immediately in face are the offices for general supervision. The road opposite these offices branches right and left, and is continued 30 ft. wide all round the hospital. Adjoining, and on the east side of the discharge block, is that for medical education, with which is incorporated the laboratory and post-mortem rooms, and, naturally, the mortuary is placed behind these in a position to which bodies can readily be removed from the hospital by the corridor at the west of the central administration buildings, and from which they can be removed directly to the road.

To the east of this block the steward's residence commands the cartway entrance to his stores yard.

The hospital entrance and reception block is placed in a central situation. The middle door and hall are for the staff and for business visitors to the matron and others, all being under the control of a porter. On one side of this hall are the rooms for ambulance nurses and the night superintendent, on the other the general waiting-room for visitors to patients, with cloak-rooms attached. The east and west doors in the block give access to the patients' examination-rooms for the diphtheria and enteric wards on the one side, and for the scarlet-fever wards on the other, accessible through the corridors to left and right.

Behind, and rising far above this one-storied block, are the residences for the matron and female servants, and the male servants, and the kitchen and steward's stores, with large yard.

The matron's quarters have been placed in the female block rather than in a separate house, because she has thus her subordinate female officers near her. She is close to her office and needle-room, and at the same time is readily accessible to visitors.

All these buildings are central for the general service of the hospital, and it has been sought to

make them also very open to both sun and wind, while internal aeration has been carefully studied.

To the east of these buildings is the residence of the assistant medical officers, in convenient contiguity to the entrance to the diphtheria wards, and equally convenient for service from the kitchen.

To the east of the central administrative block are the pavilions for diphtheria and enteric diseases. These are disposed on two floors, the upper floor approached by a staircase and lift placed internally, but approached from the outer air quite separate from the lower ward entrance.

If it should be requisite at any future time to add other short pavilions to the south base the corridor, space has been left for the purpose, in which case it is suggested that one staircase and one lift (marked E on plan) would serve both north and south blocks, as described further on in relation to scarlet-fever wards. The roof of the main corridor is made to serve as an airing balcony at the south end of the upper wards, and it is hoped it would prove a boon to the patients able to bask in the sun.

The height from the ground floor level of the diphtheria wards to the eaves of the roof of each block is 30 ft., the space between each pair of twelve bed wards being 76 ft.

To the south, distant 150 ft. from these pavilions, is the nurses' home. This position has been chosen for the following reasons:—It is handy for service from the general kitchen, it is almost equally convenient for nurses in the diphtheria, scarlet, and isolation wards. It is in the quietest position, and to the houses on adjacent properties it is free from the objections attaching to the proximity of any other hospital building. The bedrooms for night nurses are at the east end, at the remotest distance from the necessary noise attaching to the service and day work.

The dispensary faces the infirmary in a central position.

The infirmary is to the south of the central administration blocks, and there are attached wards provision is made for the treatment of air.

Between this building and the kitchen is a tower to support a large water-tank, for primary use in the event of fire. The tower is also utilised for a clock, and also for the necessary telephone exchange and fire-alarm indicator. It will have a lightning conductor.

To the west of the centre, in the front, are placed eight pavilions of two stories each for scarlet fever, of the same height as the diphtheria wards, and at similar distances apart. Two separate arrangements for access to the upper floors are shown, the first with internal warmed staircases. This necessitates a staircase and lift to each pavilion north and south of the corridor. An alternative arrangement is, however, shown on the  $\frac{1}{2}$ -in. scale drawing, and illustrated by  $\frac{1}{2}$ -in. scale details, by which one staircase and lift are made to serve for the two pavilions. It is proposed to treat this staircase in all respects as a part or continuation of the open corridor. It is suggested that the arguments in favour of the open corridor would justify the treatment of sanitary grounds, while the manifest economy of working one lift is submitted as a justification for the arrangement. If this be adopted, a nurses' duty-room may be attached to the large twenty-bed wards, and, with so many beds, this may be found a great convenience for the transaction of the statistical and report work.

To the south of the scarlet fever hospital are placed the isolation wards, served from a separate corridor.

The laundry and workshops are placed at the south-west corner of the site, in an inconspicuous position, but, as they should be, in an open spot. They are high, so that all smoke, &c., may be carried well above the hospital wards.

In the yard are steaming tanks for foul articles. Attached to the staff laundry is a good bleaching-ground. The artificer's shops, engine-room, &c., surround a yard, which enables everything to be kept tidy.

It will be noted that the general trend of all the wards is north and south, giving the maximum of sunlight to all walls. Windows are also placed close to the angles of the wards, so that no part may be left untouched by the sunlight.

The wards are protected from the cold north winds by towers containing the baths, water-closets, &c., and in like manner the airing-courts are protected by walls.

## Description of a Ward.

A description of one large ward will suffice for all, premising it by saying that the specified wall space, floor area, and cube have been strictly adhered to. The ward, then, is 14 ft. in clear height. It is approached from the main corridor and it has at its other end an external staircase for fire-escape and for subsidiary access to the airing-courts. The floor of the lower story is placed at an average of not less than 4 ft. above the ground. The floor is of steel and concrete, covered with inch polished wainscot bedded in bituminous mastic directly on the concrete, leaving no space whatever beneath. The walls are without skirting or any other projection, all angles being rounded.

The heating is by open fires and hot-water radiators. There are four open fires in the centre of the width, so arranged that all parts of the ward get

a share of radiant heat, while every patient is able to see the fire. The brick stack between the floor and the mantelshelf is entirely faced with glazed bricks of a quiet tint. There is no chimney-piece, but the glazed bricks form the fireplace, the fire being on the floor, the hearth being raised. The fire is fed by air drawn from above the floor under the hearth, and this forms an outlet ventilator for the heavy air in the room.

At the ceiling level it is proposed to construct a longitudinal air-shaft of metal. This is to withdraw the super-heated air from the top of the room, and will be fitted with valves.

Fresh air is introduced through a grated aperture from without into the bottom of each of the radiators placed under alternate windows.

These radiators serve to supplement the heat from the open fires, and as the centres from which heat is obtained are thus distributed around the walls and in the middle of the room, an equable temperature can be obtained.

Each window has a pair of sashes and a transom light hung with butts and worked by an Adams rod-opener. All windows are carried up to their ceiling, by which means greater cleanliness and more reflected light is obtained. Narrow windows are also placed close to the angles of rooms, as before noted.

The doors to the large ward are to be hung in a pair with check-action swing-hinges. The doors have fanlights carried up to the ceiling made to open for through currents of air.

The lobbies, bath-rooms, passages, and internatal staircases are heated by similar water-radiators and the small ward by open fire and radiators. The radiators, water-closets, &c., is, in all cases, similar to that in large wards.

All bath, lavatory, and sink external wastes discharge with rounded shoes into open trenches and thence to gulleys placed 18 in. from the walls.

The lavatories have been purposely placed where they are readily visible by the ward nurse on opening the door from ward. This enables better control to be maintained, especially in the case of children.

A separate lavatory and water-closet have been attached to each two-bed ward the lavatory in all cases forming a cross ventilation ante to the water-closet.

A similar arrangement is adopted for the nurse.

## Generally.

The same principles have been adopted throughout the hospital and it is, of course, unnecessary to repeat a description of them.

It may, however, be appropriate to mention that the modes of placing all the baths, water-closets, &c., in a "disconnected" tower has been adopted for nurses, matrons, and servants' houses, stores, kitchen, and laundry; indeed, for all but the private residences, and in all cases (as in the nurses' home) where there are corridors leading to the towers, two pairs of windows are placed in the neck or bridge, with a door between, so that while the tower is cut off by the door, there is ventilation to the corridor.

It may now be convenient to describe the general arrangements in more detail:—

## Power.

The boiler-house for the entire service of the hospital is placed as part of the laundry block.

The boilers are under the drying-closets of the laundries, so placed because the heat there is of service, and because the arrangement lends itself to convenience in several ways. Thus, while the face of the boilers are in a lofty well-lighted and ventilated chamber some 18 ft. high, the steam pipes are taken from the back direct through a subway to the south main corridor. Coal vaults containing about 150 tons are at the rear or south of the boilers, accessible to carts from the back road, and thus the place is kept free from dirt.

The total nominal h.p. provided is adequate to allow of one boiler always being out of use as a stand-by.

The engine-room is made large to give ample space. It is proposed to have separate engines to work the laundry and the electric plant. These have each special work to do, and special types are more economical for the work to be done respectively.

This room will contain the accumulator for the high-pressure lifts, the fire-engine, &c., to be described later on.

It will be noted that a convenient yard is attached to the engine-room for stores, repairs, &c., and adjacent to it an open store for an additional 120 tons of coal.

## Lifts.

It is proposed to have nine hydraulic direct-acting high-pressure lifts for the general service of the wards. These will each have cages about 7 ft. by 4 ft. to take a patient lying down. There will be one in each of the four diphtheria pavilions, one to each pair of scarlet-fever pavilions, and one in the most eastern of the isolation pavilions. The author has not thought it necessary to put a lift to each isolation pavilion, but has left a place so that this may be added at any time.

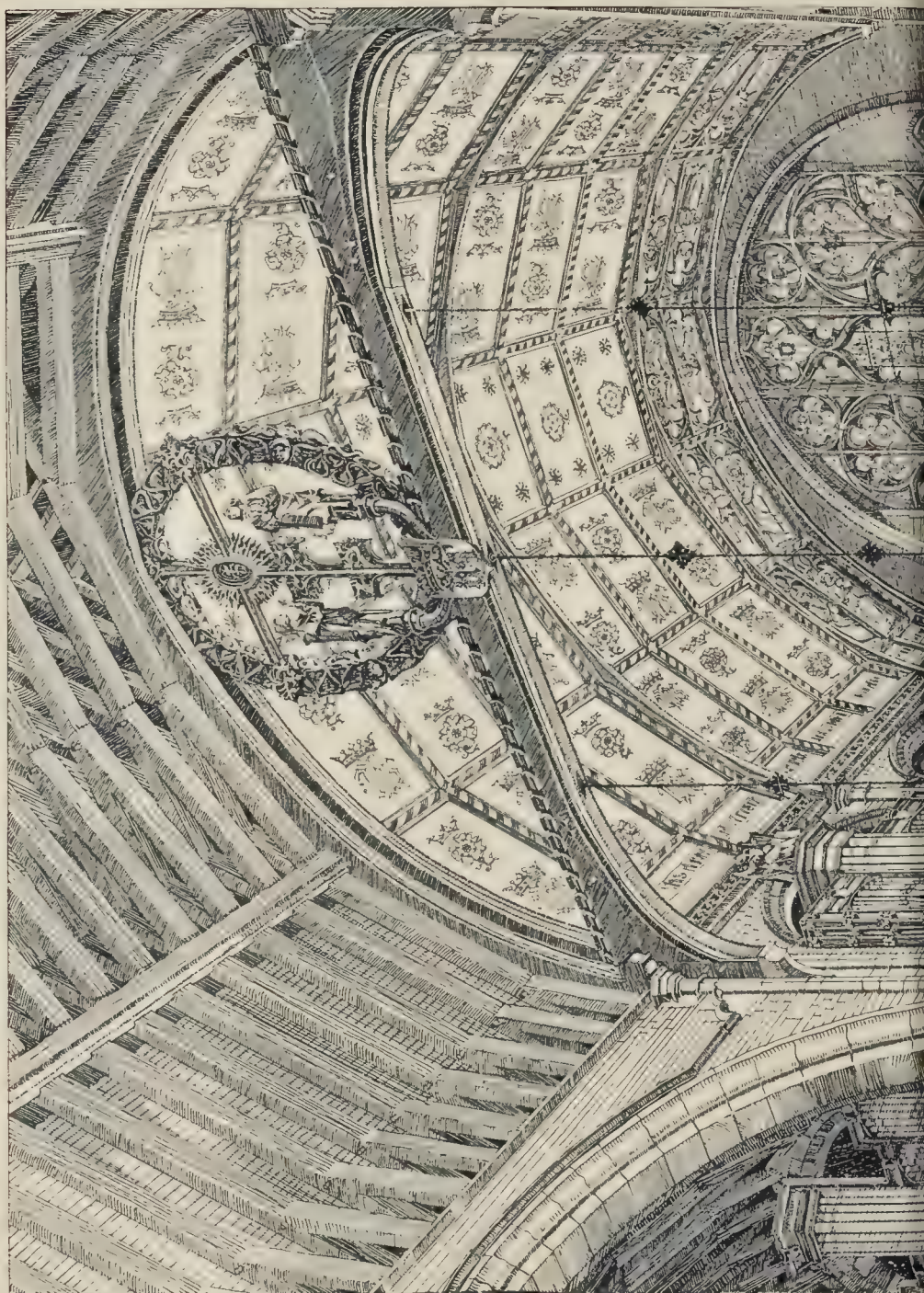
A suspended hydraulic lift is provided in steward's stores, capable of raising 2 cwt. at a time.

A similar lift is provided at the west end of the nurses' home to raise coals, &c., to the upper floors.

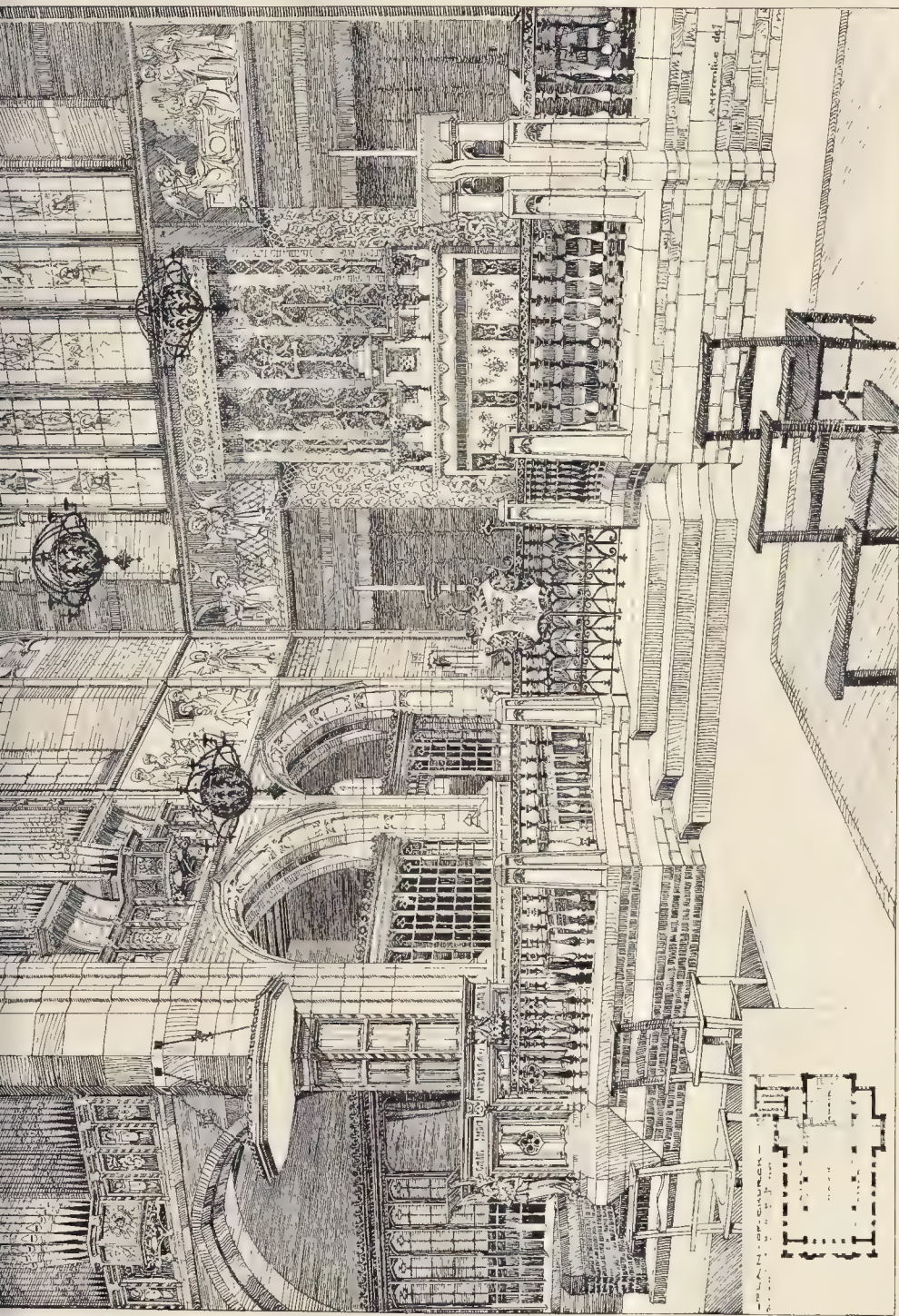




THE BUILDER, SEPTEMBER 8, 1894







NEW CHURCH OF ST. GEORGE, WORCESTER. INTERIOR OF CHANCEL. - MR. ASTON WEBB, F.R.I.B.A., ARCHT.







# \* THE PARK HOSPITAL \*

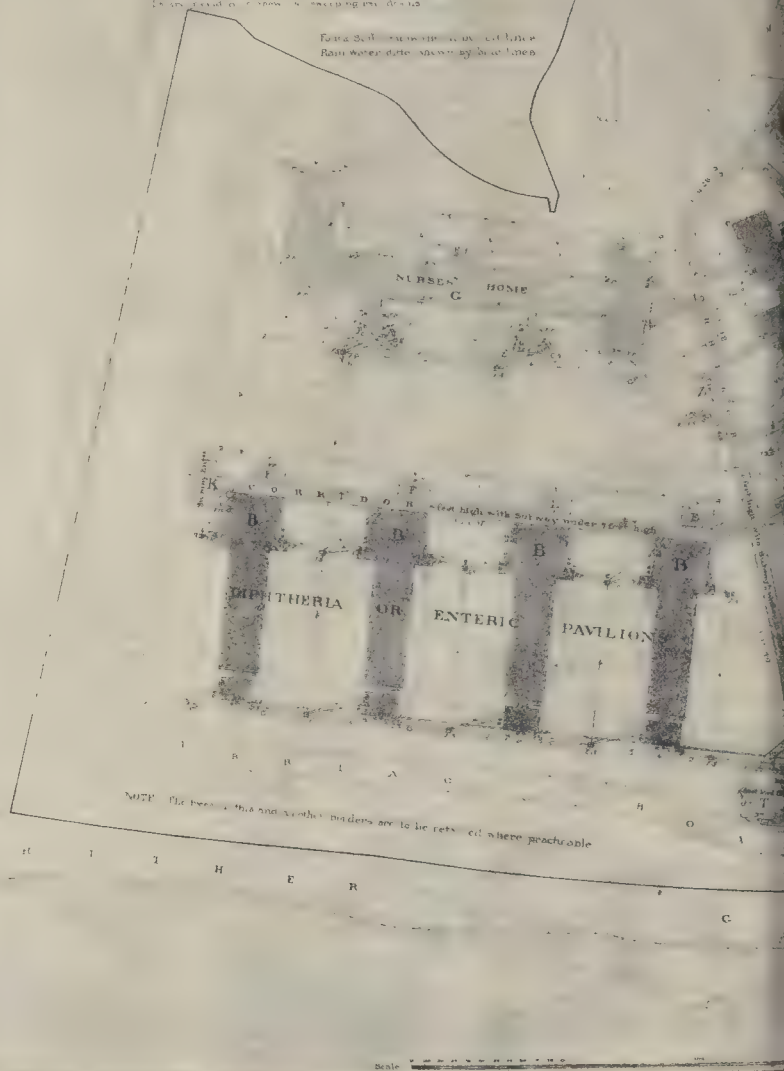
## REFERENCES

- a. See a non page
- b. Bell, Walter
- c. Lavatory
- d. Sink
- e. Galleys
- f. Kitchen
- g. Stomach
- h. Inspection
- i. Pharmacy
- j. X-ray
- k. X-ray
- l. X-ray
- m. X-ray
- n. X-ray
- o. X-ray
- p. X-ray
- q. X-ray
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- u. X-ray
- v. X-ray
- w. X-ray
- x. X-ray
- y. X-ray
- z. X-ray

For complete letter to the  
buildings see index to the  
Report

## NOTES.

- 1 The soil and foul water drainage of the following blocks are kept entirely separate and distinct by means of disconnecting traps with separate through ventilators, viz. Diphtheria, Nurse's tower and Isolation including reception rooms, Nurses home, Infirmary, Central Administration Block (including App' Med' Office) and the RW, Administration Block including residences, Medical Superintendent's Ward and Gate Porters.
- 2 Every drainage is kept from an IS.
- 3 All the Reception and the Diphtheria, Nurse's tower and Isolation including reception rooms, Nurses home, Infirmary, Central Administration Block (including App' Med' Office) and the RW, Administration Block including residences, Medical Superintendent's Ward and Gate Porters.
- 4 In order to keep the drainage of the Diphtheria, Nurse's tower and Isolation including reception rooms, Nurses home, Infirmary, Central Administration Block (including App' Med' Office) and the RW, Administration Block including residences, Medical Superintendent's Ward and Gate Porters.
- 5 Rain drainage is kept distinct from all other drainage, and is finally carried to the sea by means of a separate system of drains, and is finally carried to the sea by means of a separate system of drains, and is finally carried to the sea by means of a separate system of drains.







BLOCK PLAN

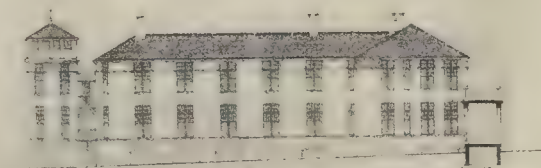
PHOTO SPRAGUE & CO. 485 EAST HARRISON STREET, CHICAGO, ILL.



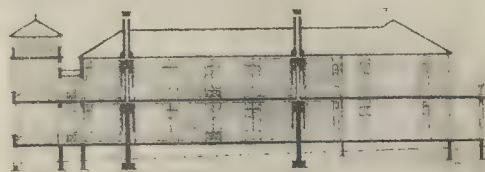




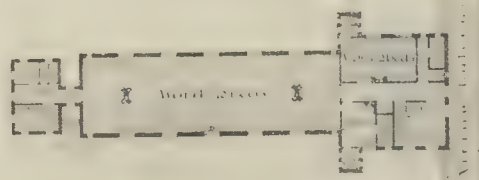
# \* THE PARK HOSPITAL \*



West Elevation

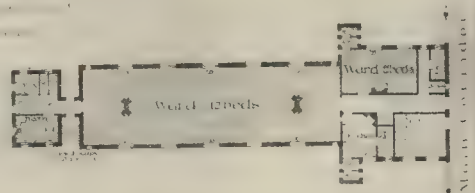


Longitudinal Section



First Floor Plan

A. ...  
B. ...  
C. ...  
D. ...  
E. ...



Ground Floor Plan

## DIPHTHERIA OR ENTERIC FEVER PAVILIONS.

Marked B on Block Plan

Details similar to Scarlet Fever building

Scale of 1/4" Genput to 1/2" ft.





Detail of F.F.



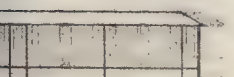
East Elevation



Elevation



Longitudinal Section



Section



First Floor Plan



Floor Plan



Ground Floor Plan

MARY

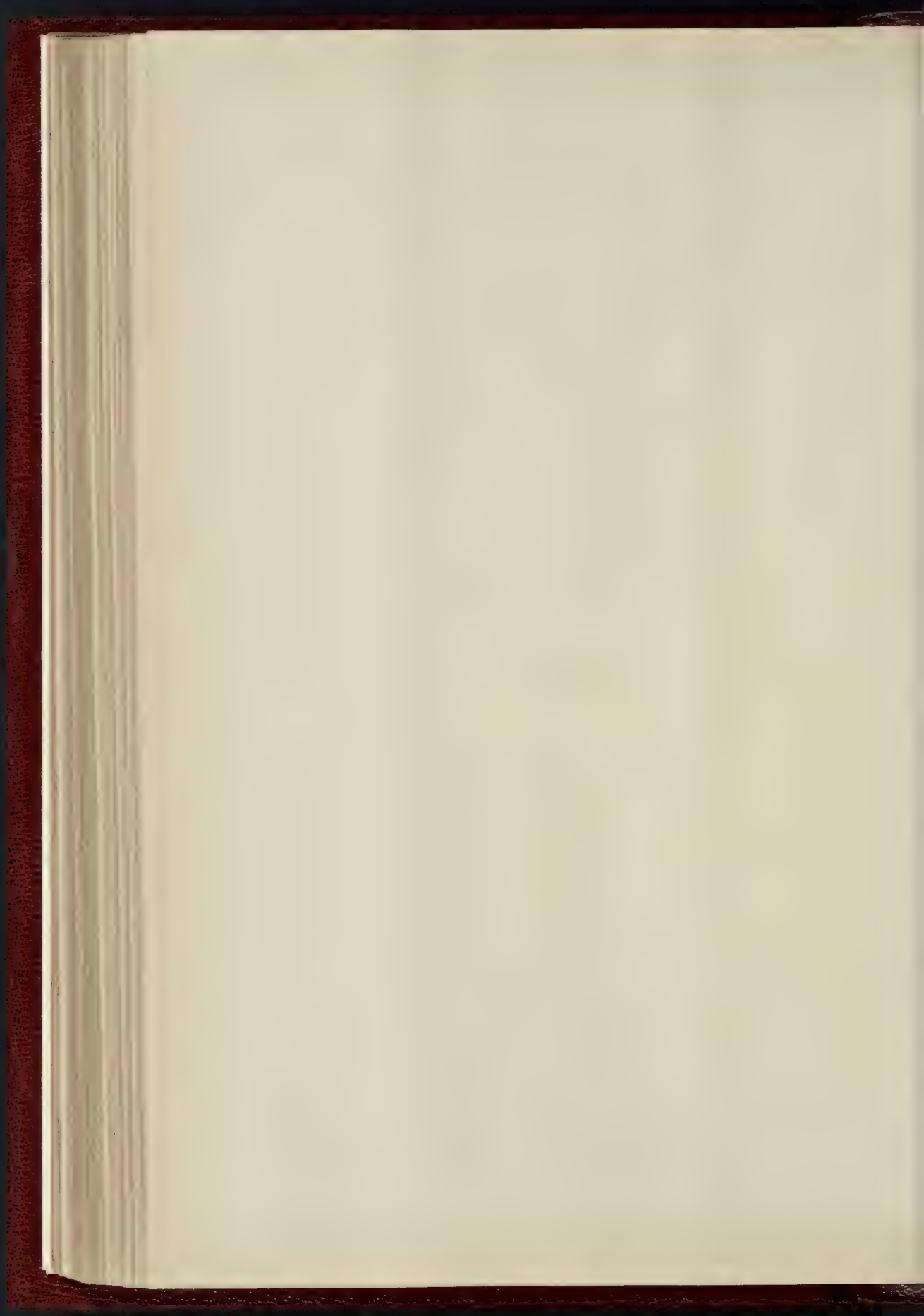
# ISOLATION PAVILIONS.

Marked C & D on Block Plan

Details similar to Scarlet River buildings.

Scale of Detail drawing

INK PHOTO. SPRAGUE & CO 4 & 6, EAST HARDING STREET, FETTER LANE, E.C.

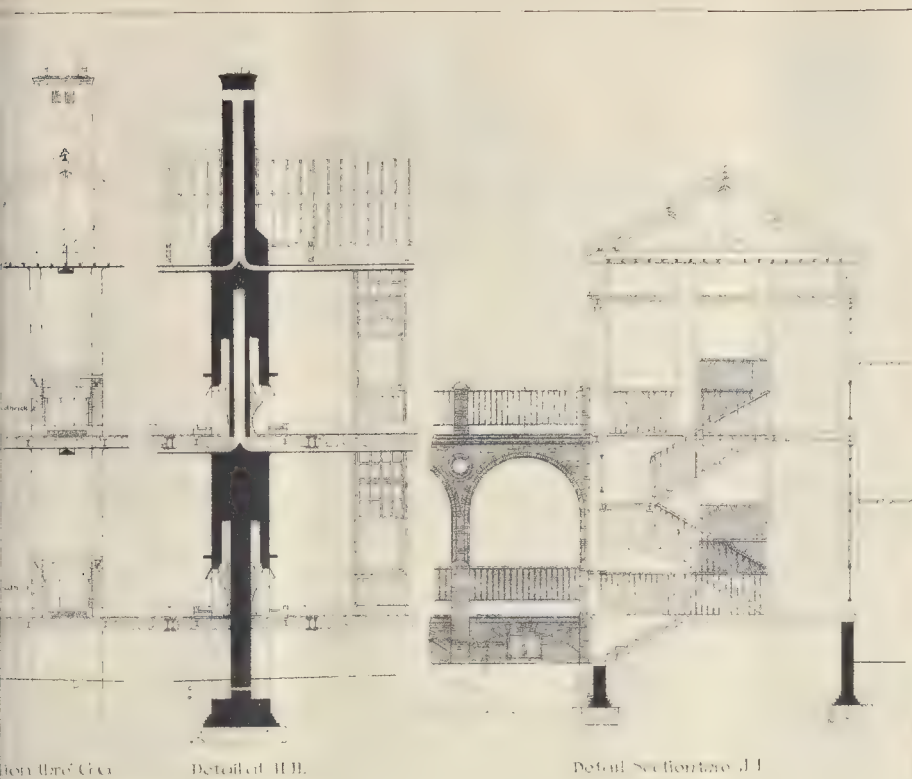








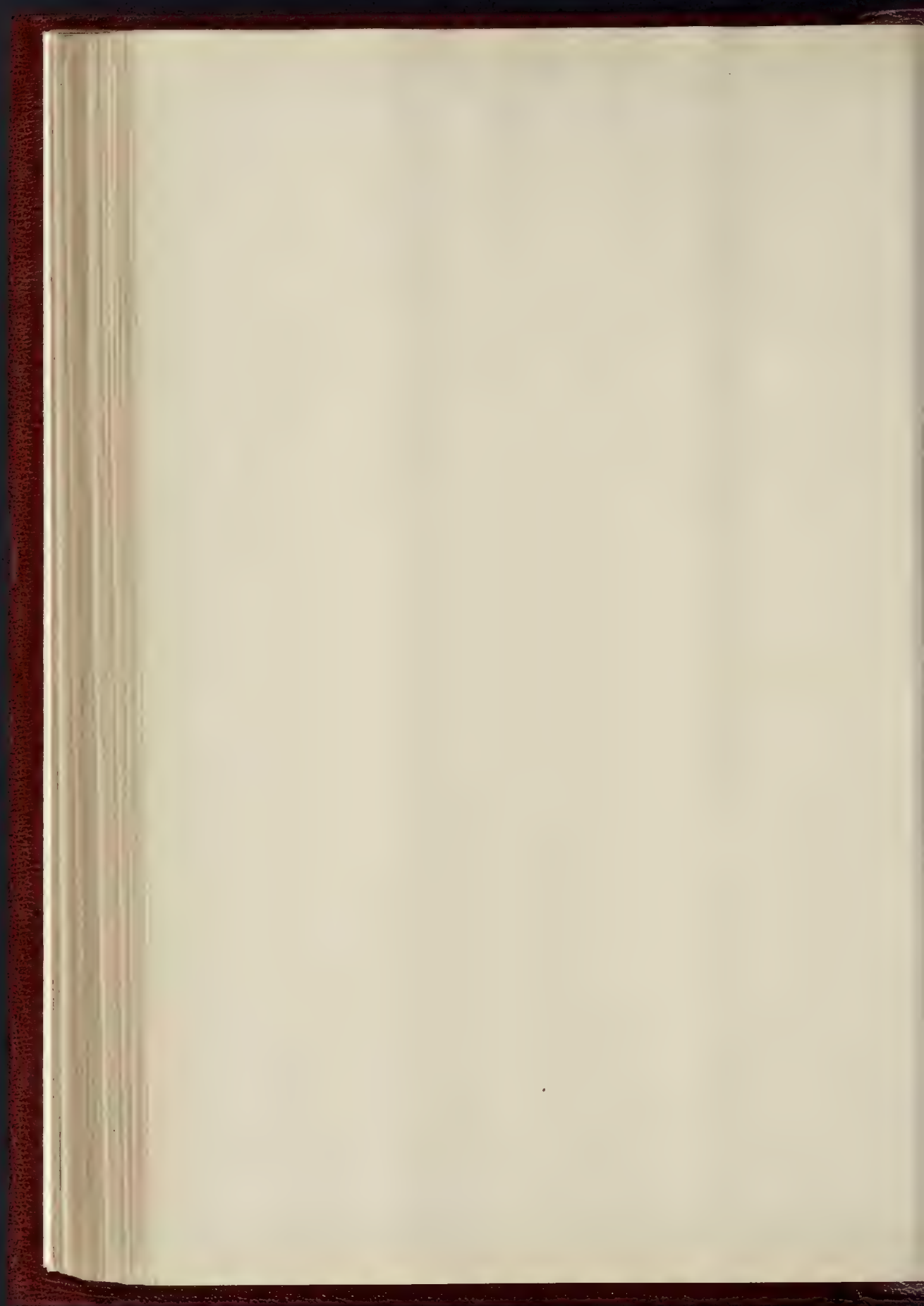




AVILIONS.  
k Plan.

Scale of Detail drawings.

INK PHOTO SPRACUT & CO 445 EAST HARDING STREET FETTER LANE 1 C





and at the east end a hand-power lift is also provided as an auxiliary.

All exhaust water will be pumped back for re-use.

#### Heating.

The heating is proposed to be by low-pressure hot water. A separate circulating service will be taken to each pavilion, and to the infirmary.

#### Hot-water Supplies.

The hot-water supply to baths, lavatories, sinks, &c., throughout the wards, infirmary, and central residences, nurses' home, kitchen and scullery, will be on a similar system but kept quite distinct from that for warming. The natural rise of the ground favours a rapid and hot circulation to every part.

#### Lighting.

The lighting throughout all buildings including residences will be electric. The roadway within the hospital curtilage has been similarly lighted. The engine plant to be used consists of three large and one small engine and dynamo combined of the "Brush Falcon" type. Two of the large ones will supply the full demand, the third being a stand-by in case of break down. The small one is to take the night service when the lights are down.

#### Telephones.

In complying with the condition that there should be telephonic communication throughout, the initial expense and maintenance had to receive consideration, and the author has worked out the schedule hereto appended at page 29 [author's report], showing fifty-two stations.

It is proposed to adopt Hunning's transmitter at each station, and to have a central exchange in the water-tower.

#### Fire Alarms.

The author proposes to fix at each of the points enumerated hereunder electric pulls or pushes, each one of which will ring alarms at three points at the same time—namely, at the engine-room, at the men's quarters, and at the gate-lodge, while an indicator in the tower exchange will notify the place of origin of the alarm.

#### Schedule of Fire Alarms.

One at the entrance end of each ward .....	36
One in the female servants' home .....	1
One in the men servants' home .....	1
One in the stores .....	1
Two in the nurses' home .....	2
Three in the infirmary .....	3
One in the laundry .....	1
Total .....	45

#### Fire Appliances.

It is proposed to place a cast-iron tank, to contain 30,000 gallons, or, say, 130 tons of water, at the top of the central tower. The intention is that this reserve shall always keep the fire-mains charged at a pressure to well command the highest part of the hospital, so that at the first outbreak there may be water available. It is probable that this supply alone would effectually control any fire likely to arise.

Off the 4-in. service mains 3-in. branches will be taken to sixty-one hydrants.

#### Kitchen Fittings.

It is intended to have all the cooking by steam and gas. The steam will be from the main heating-chamber. The kitchen will be fitted with roasting and baking ovens, steam-jacketed boiling-pans for meat, soups, stews, &c., boiling vessels for water, beef-tea pans, &c., all of the most modern type.

The scullery will have wooden, copper-lined sinks, tanks for vegetables, cabbage boilers, potato steamers, &c.

#### Laundry, &c.

The disinfecting apparatus proposed to be used is Lyons' patent.

Steeping tanks are provided in the yards in a convenient position out of the traffic run.

On the plan the general arrangement of plant in the laundry proper is shown.

It is of the most modern type, and hardly needs detailed description. Attention is, however, drawn to two or three points. 1. To obviate the wear and tear of clothes in the boiling tanks by use of the ordinary copper-sticks, it is proposed to have the tank fitted with galvanised iron cage, lifting gear and overhead traveller for running the cage into the rising tank.

2. The wash troughs are to be of enamelled porcelain.

3. The drying cloths are fitted with horses of the usual modern type, but the drying is not, as in old times, by natural evaporation. It is proposed to fit, where shown, a steam-heated battery, drawing air from the ironing-room, and driving about 5,000 cubic feet of heated air per minute through the closet at a maximum temperature of 135 deg. This ensures rapid drying.

The receiving and delivery rooms will be heated by steam-pipes.

The airing-room has been kept distinct from the ironing-room. This is better in many ways.

The whole building is well lighted by a large lantern, extending from end to end, and, in addition, by windows where most required, as shown on plan. The extraction of steam is by means of a 36-in. fan at the east end. The shaft is proposed to be of

stock brick, with a stone cap, as shown, fitted with a lighting conductor.

Attached to the shaft is a Crane's destructor, as required.

#### Materials for Building.

The materials proposed to be used in the construction are as follows:—

Concrete in trenches, 1 part of blue lias lime and 5 of gravel ballast and sand.

Concrete in floors, 1 cement to 4 coke breeze.

Stock bricks are used throughout, with dressings and mouldings of red bricks.

Copings to be of red terra-cotta.

The inner face of walls of laundry and soda-store are of glazed bricks, and so are the faces of boilers.

The columns and entablature of the education block, &c., to be of Portland stone.

The floors to be of steel girders and concrete, in all but the private residences, where they are proposed to be of fir of the usual construction.

The covering of floors in sanitary towers, water-closets, lavatories, corridors, airing-balconies, stores, basement, coal-stores, staff-scully, and similar places, is of granolithic cement.

Ward floors of polished wainscot; others of deal.

Roofs are to have on the rafters boarding, felt vertical battens, slating battens, and Bangor slates, except in the case of the medical superintendent's residence, where Broseley tiles are proposed to be used.

Walls and ceilings of buildings for patients and of disinfecter are finished with Parian cement, ceilings of corridors with trowelled Portland cement, walls and ceilings of residences generally with plaster.

#### Drainage.

Particular attention is drawn to the drains and notes on the block plan.

The drainage scheme is there described and shown in some detail.

The scheme may generally be described to contemplate:—

1. The separation of all drains of infected buildings from all of non-infected buildings.

2. The effectual ventilation of all foul drains.

3. At the head of the drains, where advisable, the bath-wastes have been taken to syphon-flushing tanks, so that a volume of water may periodically flush or scour the drain.

4. It is assumed that the rain-water must, in compliance with the Act, go into the sewer, otherwise it might be taken to an ornamental pond, and, if thought desirable, it could be pumped up for use on the premises. Its volume is considerable.

#### Airing Courts.

The whole of these courts and the space under pavilions is proposed to be paved with granolithic cement.

#### Roads and Paths.

The roads are proposed to be 4-in. coarse core, 4-in. burnt ballast, and 4-in. gravel. They will be drained into the main rain drain. These roads will all be electrically lighted.

#### Fencing, &c., and Laying out Grounds.

Having regard to the trees about the whole boundary, in many cases close to the fence, it is not thought desirable to build brick walls, as the roots would in time crack and twist them. It is therefore proposed to use 7 ft. oak "park" fencing for the general enclosing of the site, but in places shown on plan brick walls will be constructed. The entrance will have massive plain piers, surmounted by electric light, and wrought-iron gates of suitable design.

#### The Estimates.

The estimates have been prepared with every care, and in considerable detail. Approximate quantities have been taken out by a well-known surveyor for one of the large pavilions, and for a bay of the corridor and subway. These quantities have been priced by a firm of contractors of high standing, and on their estimate the prices have been based.

In the pavilion bills, the sanitary tower, the large ward, and the south block were each kept separate. By means of the first of these accurate data exists for pricing all sanitary towers throughout, and by means of the other divisions for pricing all patients' buildings. Quantities were also taken out for drainage, paving of courts, roads and paths, walls, fencing, &c., lifts and services, heating, hot water supplies, electric lighting, telephones, fire-alarms, fire appliances, kitchen and scullery fittings, laundry fittings, engines and boilers, and estimates similarly obtained from builders and specialists.

The total cost of the whole hospital gives, on the basis of 500 patients' beds, a cost per bed of nearly 370*l.*, and having regard to the modern standard of a first-class fever hospital, it is submitted that this is moderate."

#### ST. GEORGE'S, WORCESTER.

THIS church is being built at the end of St. George's-square, Worcester, to replace a small and inconvenient church erected some fifty or sixty years ago. It will seat about 730 persons, and will cost about 7,500*l.* The total width is 60 ft., and the length 117 ft. The internal width of nave and chancel is 27 1/4 ft., and the height to

ridge 51 1/2 ft. The materials used are red Stonehouse bricks and Bath stone, the roof being covered with Westmoreland slates. The decoration and some of the fittings will be executed as funds permit. The church will be lighted with electricity. Messrs. Thomas Collins & Godfrey are the builders, Mr. Birch acting as clerk of the works and Mr. Rumsey as foreman.

ASTON WEBB.

## Correspondence.

To the Editor of THE BUILDER.

### PROPOSED ROMAN CATHOLIC CATHEDRAL IN LONDON.

SIR,—It is proposed to erect a Roman Catholic cathedral as a memorial to the late Cardinal Wiseman and the late Cardinal Manning. The authorities secured a most suitable site for such a building during the lifetime of the late Cardinal Manning, and have now decided to erect a cathedral worthy of its name. To do this successfully it is most desirable to invite architects to compete for the proposed cathedral, and thus to secure the best and most suitable plan for such an important edifice. To arrive at an unprejudiced decision the jury should consist, say, of the heads of the principal academies of Europe—viz., Rome, Munich, Paris, Berlin, &c. ROMAN.

### CROYLAND ABBEY.

SIR,—The writer of your short paper on Croyland Abbey seems to think that Canon Moore's plan was purely conjectural. In this he is mistaken. The position of both the Abbot's and the Monk's door could be seen in the remains of the old south aisle wall before it was destroyed in 1859. The Abbot's door was opposite the third bay, and the Monks' door opposite the eighth bay. Your writer also seems to think that the transepts had no western aisle. A few years ago, and for aught I know now, the weathering of the west aisle of the south transept could be seen on the remains of the south-west angle of the central tower. Though western aisles to transepts were not very common, the south transept of Peterborough Cathedral and the transepts of Spalding Parish Church (both near Croyland) show that they did sometimes exist.

Canon Moore's papers on Croyland were edited by the Rev. E. Manners Sanderson, and printed by Robert Appleby, of Spalding. They give a fairly full account of the Abbey, and are well worth reading. Unfortunately they do not say a word (for reasons which some people will understand) of his own great personal exertions to preserve the splendid west front of the nave from ruin.

J. H. GREEN.

### VENTILATION FROM ABOVE OR BELOW.

SIR,—Having for many years watched the progress of this class of work as carried out in Canada and the United States, I think my information is fairly up to date in what has been accomplished. It has perhaps been the more interesting to me, as the greatest simplicity is shown in their endeavour to overcome this very difficult subject. That success lies with them in their system of floor ventilation is a fact, and for this reason I do not think it should be lightly passed over simply on the ground of the products from the burning of gas. We are told that the more deleterious elements descend to the floor as it is—in consequence of their greater specific gravity. The intensely-rarified air that hovers near the ceiling would be so diluted by the incoming fresh air that only an agreeable warmth would be apparent in its descent to the floor.

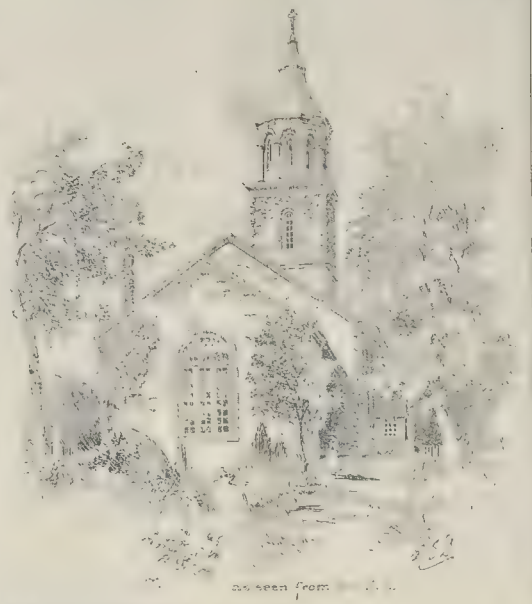
Again, many people are troubled with cold feet, and yet everything that the ingenuity of man can scheme goes to support and further, yea, to invite, the cold air currents along the floor. Is this in the wake of progress? I am inclined to say, go to the Chinese and learn of them.

I cannot help thinking if some of our eminent architects who are anxious to secure the best results for their clients would ask a few engineers for a scheme in competition they would stand a chance of seeing a better way than the present unsatisfactory one of attracting the foul air from above.

R. C.

### BUILDING STONES AT THE ANTWERP EXHIBITION.

SIR,—In your capital article under this heading, reference is made to the frequent use in the Italian section of a soft white material that had undergone special preparation, in lieu of statuary marble, for statues, groups of figures, &c. This is, as the writer rightly assumes, a kind of gypsum, a white alabaster we know in the trade as Castillino marble. The "preparation" is particularly simple, and merely consists of boiling the figure or panel after it is closely roughed out. By this process all trans-



St. Paul's Church, Eastchester, N. Y. 1893. From Sketches by Mr. E. Eden Dean.

parency is taken out of the stuff, and it becomes a dead white. Everyday-sort-of-things get fine names sometimes, as the following will illustrate:—At Chicago, last year, models of a determined-looking female, wearing a breastplate with the words "I WILL," upon it, were sold in that city at a rather long price. Examining one of these one day I remarked upon the great cost, and added "Why, they are only plaster of Paris casts." In reply, after the fashion of his class in that city, the man contradicted me bluntly, and said "They're made of a preparation of Alabaster!"

HARRY HEMIS.

#### ST. PAUL'S CHURCH, EASTCHESTER, NEW YORK.

THIS little church was erected in the year A.D. 1765, by a tax levied upon Churchmen and Dissenters alike, then becoming, under the principles of common law, the property of the Church established by law, i.e., the Anglican. It is not pleasant to reflect that its first Encumbrancer not only claimed the building, but tried to keep the Dissenters out after they had been taxed towards its erection. The stone spire was built a few years ago, following the lines of the original wooden one. The Communion plate (hagon, four chalices and paten) dates from 1829.

E. E. D.

#### The Student's Column.

DETAILS OF RURAL WATER SUPPLY.—X.  
MEASUREMENT AND ESTIMATION OF THE FLOW OF WATER.

THE units of measurement usually adopted in gauging the flow of water are the cubic foot and gallon for capacity, and a minute, second, or twenty-four hours for time.

An imperial gallon of water at a temperature of 62 deg. Fahr., and a barometric pressure of thirty inches, weighs 10 lbs., and a cubic foot contains 6.235 (practically 6.1) gallons.

The flow of water through sluices, pipes, or channels is governed by the same laws as falling bodies, and its motion would be uniformly accelerated but for the resistance offered by the friction and form of the channel.

The theoretical velocity due to the force of gravitation, friction being neglected, is expressed by the formula,

$$v = \sqrt{2gh}.$$

Where  $v$  = velocity in feet per second.

"  $g$  = the force of gravitation, or the velocity acquired by a body falling through space under the influence of the attraction of the earth, in one second.

"  $h$  = the head, vertical distance through which the water has fallen, or difference in level of the two ends of the channel, in feet.

The numerical value of  $g$  varies slightly according to the altitude and the latitude. In England the value usually adopted is 32.2 ft. per second. The above formula may therefore be written,

$$v = 8.025 \sqrt{h}.$$

If to the natural head artificial pressure equivalent to  $h'$  ft. has been added, then

$$v = 8.025 \sqrt{h + h'}.$$

These formulae require modification according to the particular form of orifice through which water is discharged.

#### Gauging by Means of an Orifice.

The discharge of water through an orifice is proportional to the area of the orifice and the mean velocity of discharge. Theoretically the discharge from an orifice should be equal to the product of the velocity of discharge and the area of the orifice. Experiment has shown, however, that the converging currents of water as they approach the aperture produce a contraction in the area of the issuing stream, varying in degree according to the form of the orifice. This is called the "vena contracta." A co-efficient, determined by experiment, has therefore to be applied in each case, so as to make allowance for this contraction.

The formula for discharge through an orifice may therefore be written,

$$Q = 8.025 ca \sqrt{h}.$$

Where  $Q$  = discharge in cubic ft. per second.

"  $a$  = area of orifice in square ft.

"  $h$  = head in ft., or the height of the surface of the water above the centre of the orifice.

"  $c$  = a co-efficient applicable to the particular form of orifice.

The following values for  $c$  are adapted from those given in Spon's Engineering Tables:—

Round or square orifices in a thin plate.....	62
Sluice at end of a rectangular channel .....	70
Short tubes (three diameters and under) with square edges .....	81
Short tubes, when the tube projects into a reservoir or cistern .....	71

The following table gives the results of experiments made by eminent observers upon circular orifices with sharp inner edges:—

Name.	Head.	Diameter of Orifice.	Co-efficient.
	Feet.	Inches.	
Abb. Bossut .....	1.5	1.5	0.649
Cotel .....	7	1.5	0.62
Vallart .....	1.5	1.5	0.633
Rennie .....	2	1	0.61
Eytelwein .....	2.1	1.5	0.618
Weisbach .....	1.5	1	0.614

Mr. Mair-Rumley, in his experiments at Messrs. Simpson & Co.'s works at Pimlico, recorded in the *Proceedings* of the Institution of Civil Engineers, found that the co-efficient of discharge was affected by the temperature of the water.

The discharge through a submerged orifice is calculated in exactly the same manner, except that the difference in level of the surface of the water on either side of the orifice is taken as the head.

#### Gauging by Means of Weirs.

For this purpose a sharp-edged weir, Figs. 14 and 15, gives the most satisfactory results. A still-



Fig 14

water pond should be formed on the up-stream side of the weir, to steady the flow of the water. A peg should be driven at a point in this pond as far as

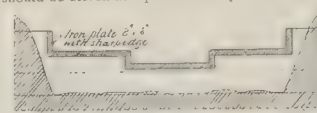


Fig 15

possible from the weir, and the upper surface of the peg should be made perfectly level with the upper edge of the weir. As it is difficult to drive a peg with precision under water, especially when the bottom of the pond is hard and stony, the following is a useful practice:—Drive the peg so that its upper surface is slightly below the



required level, and then drive a long flat-headed nail into the top of the peg. By means of a hammer the nail may be easily driven until its head is exactly level with the upper surface, or sill, of the weir. To construct a weir for the purpose of ascertaining the discharge of a stream of water, a water-tight dam must be formed, the best material for which is clay. In this dam the weir is fixed, which usually consists of a plank or frame of wood, with a rectangular notch cut in its upper edge. The plank is kept in a vertical position by means of stakes driven on either side of it. The horizontal edge of the notch, over which the water flows, must be fixed perfectly level, and must be bevelled so as to present a thin edge on the up-stream side. The depth of the water below the sill of the weir on the up-stream side should not be less than three times the depth of the water flowing over the weir; and the difference in level between the surface of the water on the down-stream side of the weir and the sill of the weir should not be less than half the maximum depth of the water flowing over the weir.

The theoretical formula for the discharge of water through rectangular notches is,

$$Q = \frac{2}{3} L \sqrt{(2g)} H^{\frac{3}{2}}$$

where  $L$  = length of notch in feet.

$H$  = height in feet of the free-level of the discharging water above the sill.

$Q$  = discharge over weir in cubic feet per second.

Owing to the interference with the free flow of the stream occasioned by the ends and sill of the notch, a co-efficient,  $c$ , has to be applied to this equation, bringing it to the form—

$$Q = \frac{2}{3} c L \sqrt{(2g)} H^{\frac{3}{2}}$$

The co-efficient  $c$  varies with  $L$  and  $H$ .

With values of  $H$  between .25 and 2, and with  $L$  not less than 2, the co-efficient  $c$  is fairly constant, and may be taken as .62, which is the same as that for the discharge of water through round or square orifices in a thin plate, given above.

In cases where extreme accuracy is not required, the following formula, proposed by the late Mr. Thomas Hawksley, F.R.S., may be employed:—

$$Q' = \frac{Lh\sqrt{h}}{2}$$

Where  $Q'$  = discharge over weir in gallons per second.

$h$  = depth of water flowing over weir in inches.

$L$  = length of notch in feet.

The following table has been calculated from this formula:—

DISCHARGE IN GALLONS PER 24 HOURS FOR EACH FOOT IN WIDTH OF SILL.

Head of Water.	Decimals of an inch.										Head of Water.
Inches.	'0	'1	'2	'3	'4	'5	'6	'7	'8	'9	Inches.
0	—	1,364	1,883	2,097	2,307	25,271	28,978	32,203	35,040	37,381	0
1	43,200	44,033	44,797	45,491	46,115	46,768	47,450	48,161	48,901	49,670	1
2	124,48	124,408	124,436	124,464	124,492	124,520	124,548	124,576	124,604	124,632	2
3	224,467	224,477	224,487	224,497	224,507	224,517	224,527	224,537	224,547	224,557	3
4	343,000	343,012	343,024	343,036	343,048	343,060	343,072	343,084	343,096	343,108	4
5	480,971	480,983	480,995	481,007	481,019	481,031	481,043	481,055	481,067	481,079	5
6	634,474	634,486	634,498	634,510	634,522	634,534	634,546	634,558	634,570	634,582	6

All measurements of depth should be taken at the peg above referred to, which should be situated at least 3 ft. above the weir. A thin steel rule should be used for this purpose.

Where, however, only the approximate discharge is required, the measurement may be taken over the sill of the weir. This method will obviously give a low discharge.

#### Gauging by Means of Uniform Channels.

The calculation of the discharge by uniform channels, such as canals and bye-washes, is of great importance in waterworks engineering, and has received much attention.

At the commencement of this chapter it was stated that the flow of water through sluiceways or channels is governed by the same laws as falling bodies, and its motion would be uniformly accelerated but for the resistance offered by the friction and form of the channel. The principal part of the friction is proportional to the square of the velocity, and is nearly the same at all depths. The friction, however, varies accord-

ing to the surface of the fluid exposed to the solid in contact therewith, in proportion to the whole quantity of fluid; that is, the friction for any given quantity of water is as the surface of the bottom and sides of a river directly, and as the whole quantity of water in the river inversely. Therefore, supposing the whole quantity of water to be spread on a horizontal surface equal to the bottom and sides, the friction is inversely as the height at which the river would then stand, which is called the Hydraulic Mean Depth (Eytelwein's Hydraulics). The Hydraulic Mean Depth may be simply stated as the sectional area of a stream divided by its wetted perimeter.

Perhaps the most generally useful formula is that devised by Eytelwein, and slightly modified by Beardmore:—

$$v = 55 \sqrt{h \times 2f}$$

Where  $v$  = velocity in feet per minute.

$h$  = hydraulic mean depth.

$f$  = fall in feet per mile.

This formula must, however, be used with caution.

The following formula is given in Box's "Hydraulics" for long channels, neglecting head due to velocity of entry, which in long channels is inappreciable:—

$$C = \left( \frac{874520 \times F \times A}{L \times P} \right)^{\frac{1}{2}} \times A$$

Where  $L$  = length of channel in yards.

$A$  = cross-sectional area of stream in square feet.

$P$  = wetted perimeter.

$F$  = fall in inches.

$C$  = cubic feet discharged per minute.

#### Gauging by Means of Surface Velocity.

The discharge of a stream may be found by observing the surface velocity by means of a wooden float or weighted tube. The time occupied by the float in passing over a measured distance (which should be as great as possible) is noted, and the velocity reduced to lineal feet per second. As the surface velocity in the centre of a stream is greater than the mean velocity of the whole body of water, a proper allowance must be made.

The proportion which the mean velocity of the water in a stream of tolerably uniform section bears to the surface velocity at the centre has been made the subject of much investigation. The following formulae, amongst others, have been proposed:—

$U$  = Mean velocity in feet per second.

$V$  = Surface velocity at centre in feet per second.

1.—Prony:—

$$U = \frac{V(V+7.783)}{V+10.345}$$

2.—Neville (for velocities less than 10 ft. per second, in small channels):—

$$U = .816 V.$$

3.—Boileau (depth not exceeding 1 ft.):—

$$U = .785 V \text{ to } .865 V.$$

4.—Beardmore:—

$$U = (V+2.5) \div \sqrt{5V}.$$

The discharge is found by multiplying the mean sectional area by the mean velocity of the stream. On a large scale an instrument called a *current-meter* is frequently used to determine the velocity, and hence the discharge of a stream.

The results arrived at by the above methods are only to be adopted when more reliable data cannot be obtained.

Very small streams may be gauged by allowing the water to flow into a vessel of known capacity (e.g., a *tail or cistern*), and noting the time taken in filling.

#### Memoranda.

Cubic ft. per minute  $\times 9,000$  = gals. per 24 hours.

Gallons  $\times 1,604$  = cubic ft.

Cubic ft.  $\times 6.25$  = gallons.

#### GENERAL BUILDING NEWS.

**ADDITIONS TO BERWICK CHURCH, SHREWSBURY.**—This church, which stands in Berwick Park, has been built at different periods, the older portions of the nave dating back probably to the sixteenth century. Until recently it consisted of a nave, tower, and porch. The tower was built about the year 1672 by Sir Samuel Jones, who endowed the church and built and endowed the adjoining almshouses and hospitals. The church has recently been enlarged by Mr. James Watson (for many years M.P. for Shrewsbury) by the erection of a new chancel, south chancel aisle, organ-chamber, clergy and choir vestries and north and south porches, which were consecrated by the Bishop of Lichfield on the 28th ult. The buildings are of Grimsil stone, in the Classical style of the buildings of the seventeenth century. The semi-circular chancel arch is the full height of the nave, so as to afford an uninterrupted view of the east end. There are four millioned windows lighting the chancel and organ-chamber. The ceilings are semi-circular vaults panelled with moulded ribs. The east window has been filled with stained glass by Messrs. Comere & Capronnier, of Brussels, representing "Christ Blessing Little Children." The other windows are in geometrical patterns by Messrs. Camm, Bros., of Smethwick. The seventeenth-century wrought-iron altar railing has been restored and refixed. The chancel is paved with encaustic tiles from Messrs. Godwin's Luggwardine Tiles, Hereford. The south chancel aisle contains oak seats for the inmates of the adjoining almshouses. The ancient oak pulpit has been restored and refixed. The oak choir seats, prayer-desk, and eagle lectern have been made by Messrs. Jones & Willis, from designs prepared by the architect. The two-manual organ has been erected by Messrs. Walker & Sons, of London. The whole of the walls of nave and chancel, from floor to ceiling, have been panelled in oak with carved cornices, the east end having emblematical carvings by Mr. T. Catley, of London. The hot-water heating, gas-fittings, and ironwork, are by Lea, Sons & Co. of Shrewsbury. The whole of the works have been carried out from the designs and under the superintendence of Mr. F. B. Osborn, architect, of Birmingham, the contractors being Messrs. W. Bowler & Sons, of Shrewsbury. Mr. James Thorneloe having been clerk of the works.

**BUILDINGS EXTENSION SCHEME, UNIVERSITY OF ABERDEEN.**—The executive committee has issued a further appeal for additional funds to complete this scheme. The University Court has contracted for building at Marischal College an east wing, accommodating the Mitchell Graduation and Examination Hall, Students' Union, and Anatomical Department; a north wing, accommodating chemistry, pathology, surgery, and botany and heightening the central tower; and at King's College a new pavilion, containing gymnasium, refreshment-rooms, and attendant's house, besides separate accommodation for lady students. These buildings are now in progress, part of the east wing being roofed, and the central tower already forming a prominent feature in the view from high-lying parts of the city. The further buildings contemplated at Marischal College consist of a front block to Broad-street, accommodating administrative offices, law, practice of medicine, agriculture, and other departments, and a south wing accommodating the natural philosophy department. The Town Council of Aberdeen has undertaken to rebuild Greyfriars Church, an ancient edifice, formerly the college kirk, now a *quondam* parish church, the present site of which will be absorbed by the extension—the new church costing at least 6,000l. The Town Council has also handed over to the University Court, free of cost, the Old Water House in Broad-street, valued at 800l., and has purchased, at a cost of 3,350l., the property at the corner of Broad-street and Queen-street, with the view of taking down the buildings and completing the improvement. Mr. A. Marshall Mackenzie, A.R.S.A., Aberdeen, is architect. It may be of interest to mention that the old buildings in Broad-street to be removed to make way for the extension include the house where Lord Byron lived for a time while a schoolboy in Aberdeen.

**WICKER GOODS STATION, SHEFFIELD.**—The Midland Railway Company's Wicker Goods Station has just been reopened, after alterations, which have been going on there since June, 1892. The new offices have a frontage to Saville-street. They cover an area of about 650 square yards, are erected of red brick, relieved with terra-cotta, and consist of three separate floors. On the ground-floor is the general correspondence office and offices for the cashier, staff clerks, store-rooms, &c. On the second floor are offices for officials, and on the third floor are similar offices. The offices will be lighted throughout with electric light, and for general working convenience are connected by a balcony and bridge with the goods warehouse and by spiral staircases with the platforms on the ground-floor and the stock warehouse above. The new warehouse consists of basement, ground floor, and upper floor. The basement is used for the storage of wines and spirits under bond, and ale in casks, and has a storage area of 5,500 square yards. The ground floor and upper floor are each of the same dimensions, and they are fitted with hydraulic cranes, lifts, capstans, and traverse tables. In the two floors there is a total area available for general storage of about 8,200



square yards. In the construction of these buildings a large amount of ironwork has been used, all of which is of English make. The space between the offices and the warehouse, as well as at either end, is covered with a glass awning, measuring some 4,300 square yards. The floor is laid with wood. The goods-yard has been entirely remodelled, and on the Spital Hill side of the yard an engine-house has been erected, in which are placed the engines, boilers, dynamos, &c., for working the hydraulic appliances and the electric light. The electric light installation consists of three single cylinder horizontal engines, by Marshall & Sons, Gainsboro', two indicating 80 horse-power each, and one 30 horse-power, four 35-light arc dynamos of the Thompson-Houston pattern, and one incandescent dynamo for 300 16 candle-power lamps, by Mathen & Platt. The incandescent lamps are for the offices, and in the Wicker warehouses and yard, and the engine-shed, Cardigan and Grimsthorpe sidings, there will be upwards of 110 arc lamps, each of 2,000 candle-power. The general contractors are Messrs. G. Longden & Sons, Neepsden, and sub-contracts were issued to the following firms:—For ironwork, of which some 2,000 tons have been used in the construction of the new warehouse, all of English make: Messrs. Eastwood, Swingle, & Co., Derby. Hydraulic cranes and hoists: Messrs. Armstrong, Mitchell, & Co., Newcastle-on-Tyne. Hydraulic capstans, &c.: Messrs. Tannett, Walker, & Co., Leeds. Painting: Messrs. Bagnall & Co., Shipley, Yorkshire. Plumbing: Messrs. J. B. Corrie & Sons, Sheffield. The company's architect, Mr. C. Trubshaw, has had control of the new work, and he has been assisted by Mr. G. E. Hardy, as clerk of works. Mr. S. W. Johnson, the company's principal engineer, has superintended the erection of the hydraulic machinery. Mr. W. Langdon, the company's electrical engineer, is responsible for the electric light installation.

**RESTORATION OF SWINFORD CHURCH.**—The restoration of Swinford Church, near Rugby, has commenced under the superintendence of Mr. H. M. Townsend, Diocesan Architect, Peterborough, who has also prepared the plans. The work includes the erection of a new chancel with apsidal terminations. It is proposed to re-floor and re-seat the nave, and to remove the western gallery. The east end of the church will be raised by seven steps in the nave, and provision is made for an organ-chamber and vestry, approached by arches from each side of the chancel. The above work forms part of a scheme for the restoration of the church, the cost of that at present taken in hand being estimated at 1,000*l.* The contractor is Mr. H. K. Franklin, of Deddington.

**CO-OPERATIVE STORES, LEEDS.**—On the 1st inst., extensions to the Co-operative Stores were opened at Leeds. The extension, of which Mr. Walter S. Braithwaite, of Leeds, is the architect, stands on the west side of Albion-street, to which it has a frontage of 80 ft., with a depth extending to Upper Mill Hill of 104 ft. It covers an area of 1,000 yards. For the most part it is to be devoted to the drapery and furniture business. The ground floor is to be given up to the furnishing department, with the exception of two front windows on the north side of the entrance. The floor is reached by the large central entrance, and purchasers may go from one department to another without coming outside. The first floor forms the drapery and millinery department. The second floor is to be devoted to workrooms for dress and mantle making. The third floor is the tailors' workroom. The basement has been given up to the furnishing department. The building is lighted throughout by electricity. Under the basement are the boiler-house, air-trunks, and receivers. The elevation to Albion-street is of stone from the Halifax district, that to Upper Mill Hill of pressed brick, and the rest of glazed brick. The floors are supported by iron columns, with English steel and iron beams and girders, and each is, as far as practicable, fireproof. The flooring is of wood blocks, and the ceilings, which are lofty, are panelled in concrete. The total cost will be about 17,000*l.* The contractors are—Mr. C. Myers, stone and brick work; Messrs. Bagshaw & Sons, Batley, iron roofs, girders, and columns; Messrs. A. & J. Wheeler, concrete fireproof flooring; Mr. Thos. Moore, plasterers' work; Messrs. Watson & Worsnop, slaters; the society's own workmen, who, under the direction of Mr. Philemon Rump, the clerk of works, have done the carpenters' and joiners' work, and the plumbing, painting, and glazing; Mr. Edwin Oldroyd, the electrician, and warming appliances; Messrs. Tannett, Walker, & Co. have constructed the hydraulic hoist by which goods will be conveyed to and from the several floors; and Mr. J. A. Edmondson, the electric lighting.

#### SANITARY AND ENGINEERING NEWS.

**THE HERMITE SYSTEM OF SEWAGE PURIFICATION.**—The United States Consul at Havre, in a recent report on "Electrical Sanitation," observes: "The report of a scientific and technical commission, composed of eminent chemists, engineers, and sanitarians, appointed by the Municipal Council of Havre to investigate the Hermite system, states that after prolonged experiments on an elaborate scale

carried out thereon in the quarter St. François, the results show that while the system gave excellent results from a sanitary standpoint, it cannot be considered an economical system, but requires further study and improvement before it can be recommended as applicable to large cities and towns. The conclusions of the commission in detail are: Electrolysed sea water is a powerful antiseptic and germicide. The activity of the agent is in proportion to the quantity by weight of chlorine used. The disinfecting action of the liquid is not instantaneous, but continues as long as there is an excess of chlorine remaining—that 7½ grains of active chlorine will, with sufficient time, completely disinfect the excreta of a normal "stool" or dejection, and after two hours of contact all pathogenic germs will be destroyed and disappear. The commission considers Mr. Hermite's process of sanitation by electrolysed sea-water under the following conditions to be of great value:—To act efficiently on the material to be disinfected the electrolysed water must be sufficient in quantity, and contain at least 4½ grains of free chlorine per pint. The excreta must be kept in contact with the liquid in the siphon of the closet or other receptacle a sufficient length of time to ensure the antiseptic action of the liquid before being discharged into the drain or sewer. Some doubt is expressed as to whether a chlorine liquid of the kind can be applied freely to dwellings without producing disagreeable, if not unwholesome, effects, and without destructive corrosion of metal pipes. It is believed that the chlorine gas will pervade the house to a greater or lesser extent, imparting its disagreeable odour to articles of food it may come in contact with, and irritating the lungs of the occupants.

**SEWAGE SCHEMES, GLASGOW.**—At a meeting of the Sewage Committee of Glasgow Police Commissioners on Monday, approval was given to a scheme prepared by Mr. McDonald, the City Engineer, for the erection of sewage purification works at Dalnair, similar to those at Dalnair, for dealing with that part of the sewage of the city on the north bank of the Clyde not touched by the east-end works. The scheme proposes that the greater part of the drainage area to be dealt with, covering 4,500 acres, shall be carried in a gravitation sewer, without pumping, to the Corporation lands at Dalnair and there purified; and it is also proposed that the lower levels of Glasgow and Partick, extending within the city boundary to 800 acres, be pumped into an outfall sewer at a station on the Kelvin. An estimate of the cost will be prepared.

**SEWAGE TREATMENT IN UPPER AIREDALE.**—Mr. Frederick Herbert Tulloch, M. Inst. C.E., of the Local Government Board, held an inquiry on the 31st ult. at the School Board, Eastburn, in connection with the application of the Keighley Rural Sanitary Authority for power to borrow money for sewerage and sewage disposal at the villages of Sutton, Sutton Mill, and Eastburn, and disposal works for the village of Steeton. Mr. R. B. Broster (engineer), of Messrs. Barber, Hopkinson, & Co., and members and other officials of the authority were present. It was explained that in Sutton, Sutton Mill, and Eastburn, with a total of 534 houses, the daily sewage from an estimated population of 2,670, was estimated at 80,000 gallons, and this it was proposed to treat on a four-acre site; the total cost of the undertaking being 5,476*l.* 9s. 3d. Steeton had already constructed a sewerage system, and a field had been purchased adjoining the Aire, the cost of the scheme being 1,546*l.* 15s. 9d. Both systems would be on the principle of intermittent downward filtration. It was proposed to allocate the expenditure as under:—Sutton proper, 5,400*l.*; Eastburn, 1,000*l.*; Steeton, 1,550*l.*; total, as applied for, 8,050*l.*

**WATER SUPPLY, WYRE AND BISHAMPTON, WORCESTERSHIRE.**—The Persbore Rural Sanitary Authority have instructed Mr. J. E. Wilcox, C.E., of Birmingham, to prepare plans and specifications and obtain tenders for the works of water supply at Wyre and Bishampton.

**SEWAGE DISPOSAL, PELSALL AND RUSHALL, STAFFORDSHIRE.**—The Walsall Union Rural Sanitary Authority have called in Mr. J. E. Wilcox, C.E., of Birmingham, to prepare schemes for the sewerage and sewage disposal of the districts of Pelsall and Rushall.

#### FOREIGN AND COLONIAL.

**FRANCE.**—M. Barthou, the Minister of Public Works, on his return from his visit to England, has informed the editor of *Le Temps* that he was at once astonished and jealous at the facilities of transport in England, and especially in London; and he is determined to press on that point, as soon as it meets the immediate commencement of the Paris metropolitan railway, the construction of which, he says, presents no such difficulties as those of the London line. It is to be feared however that M. Barthou will find difficulties of another and semi-political kind opposed to the realisation of the scheme. A metropolitan railway would mean a number of Parisians living outside the octroi barriers, to the diminishing of that important source of income to the municipality; and that fact alone is likely to be an important obstacle. The works for the

enlargement of the Ecole de Droit, Rue Soufflot and Rue St. Jacques, are being actively carried on, and it is expected the building will be completed by the end of the year. There is talk of pulling down the Eden Theatre, and appropriating the site to a building for business purposes.—M. Maillard, the sculptor, has been commissioned by the Department of Fine Arts to execute a monument to Brantôme, to be erected in the little village of Bourdellies. It is announced that the prison of Châteauneuf at Amiens has been destroyed by fire.—The Conseil-Général of Vaulx has recently passed a vote to demand from the Government the complete restoration of the Roman Theatre at Orange.—The towns of Eu, Mers, and Tréport have had an artesian well bored at a joint expense, which is intended to furnish drinking water for the whole district in which these towns are situated, and which is so much frequented during the bathing season.—M. Metzger, Ingénieur-en-Chef des Ponts et Chaussées, has been appointed to the newly-created post of Inspector-General of Public Works in the Colonies. The French Government has decided on the laying out of a house for the French Embassy at Vienna. It is to be built by a French architect.—The jury of the International Exhibition at Antwerp has awarded Medals of Honour to M. Deglane and M. Loriot, architects, of France.

**GERMANY.**—The Emperor and Empress were present at the consecration of the sarcophagi of the Emperor William and his Consort in the mausoleum at Charlottenburg. The works are by Professor Encke, and are executed in Carrara marble.—The new Imperial Houses of Parliament at Berlin are to be completed by October 1, and overtime is being worked in order to have all ready by that date. Herr Wallot is now engaged on the designs for the laying out of the approaches. The contract for the main building of the 1896 Industrial Exhibition is to be settled this year, so that building may be commenced early next spring.—The new tramway lines over the Linden are to be opened for traffic on the 15th.—The following gentlemen have been nominated members of the Berlin Academy of Sciences: Messrs. Wichert, Reimann, Hinkeldey, Wolff, Wallot, von der Hude, Crämer, Haack and v. Beyer.—On the occasion of the opening of the new Imperial Houses of Parliament, Professor Wallot will receive the degree of Phil. Dr., *honoris causa*, from the University of Gießen.—The Government has granted travelling stipends of 150*l.* each to five nominees of the Archaeological Institute.—The designs sent in by the nine sculptors to whom the competition for the statutory for the Emperor William Memorial Church was limited, are now being considered by the National Art Commission.—On the occasion of the two-hundredth anniversary of the death of Halle the Emperor has presented his portrait and a sum of 1,800*l.* to the Festival Committee. To commemorate the occasion the Province renovated the church of St. Mary Magdalene, on the Moritzburg, at a cost of 9,500*l.*, and the city gave a bust to Thomasius. A statue of the renowned surgeon, Richard Volkmann, was unveiled in the entrance to the Surgical Schools.—The Dresden Art Exhibition, which was recently opened by the King of Saxony, is held for the first time in the new building designed by the late Professor Lipsius. Eight hundred works of art are exhibited out of a total of 2,150 sent in. The Royal Galleries have lately acquired the Earl of Dudley's famous collection of 1,000 pictures, called "the Alara."—The Provincial Diet of Gotha is about to purchase the Palace of Friedrichsthal from the Duke for 14,400*l.*—A fresco portrait of the Duke Frederick of Teck, hitherto painted out, has been discovered in the lower engine-room of the Small Arms Factory of Mauser, at Oberndorf. The room formerly served as the refectory of the Augustinian Monastery founded by the Dukes of Teck.—A monument to the poet Heinrich Laube is to be erected at Spottau, his native town.—It is proposed to place all the relics collected during the *Limes* investigations in the German National Museum at Nuremberg.—Near Nidden, on the Kurische Nehrung (Baltic coast), traces have been discovered of dwellings dating from the Stone Age, by Herr Hollack, of the Prussia Museum. The finds are from 10 ft. to 12 ft. below the surface, and partly under water. They consist of rude stone implements for the most part, and, judging from the different strata superimposed, are supposed to date from about 3,000 years before the Christian era.—The sculptor Mathias Vordermayer, principally known for his works in wood, has died at an early age. A figure of his, representing Domestic Industry as a maiden spinning, has attracted much favourable attention at this year's Berlin Art Exhibition.

**RUSSIA.**—The Ministry of Communications is considering a proposal to construct a direct waterway between the Baltic and the Black Sea, utilising the rivers Dvina and Dnieper on the way. The scheme, which would be of great strategical value as connecting the two fleets, includes the building of a harbour either at Cherson or Kachowka.—To commemorate the marriage of the Grand Duchess Xenia the Czar is establishing an educational institute for girls, and has given 400,000 roubles towards the rebuilding of the palace of the late Grand Duke Nikolai Nikolajewitch for this purpose.



**BELGIUM.**—Two Roman monoliths have been recently unearthed in the Mediarus Church at Werwica, in West Flanders. The church dates from the fourteenth century, and occupies the place of a Roman temple mentioned by Cæsar as the Verovicum.

**DENMARK.**—The contracts for the building of the Copenhagen Town Hall have been distributed. The cost of the main building will be 506,000 kr., and that of the annexe 374,000 kr. The greater part of the work is to be completed in 1895.—A new municipal church is to be built in Copenhagen at a cost of 85,000 kr.—The Administration of the Danish State Railways has decided to construct extensive new goods depôts in Copenhagen at a cost of 575,000 kr.—The construction of the great offices of administration and depôts of the "free harbour" in Copenhagen is now being carried on by a large staff of workmen from designs by Herr Dahlerup, architect and Councillor d'Etat.—One of the most important buildings added to modern Copenhagen, in recent times, is that containing the new premises of the Great Northern Telegraph Company, whose head offices are located in that city, and those of the Copenhagen Private Bank, each company occupying one-half of the building. The building has been constructed from Bremen sandstone, with plaques of fine red tiles, and columns of red granite from the island of Bornholm. The ornamental details are executed in calmed and glazed clay, harmonising with the tone of the sandstone. The building is crowned by a bronze statue of "Electra," holding a torch, whence the electric light will be flashed, modelled by the Norwegian sculptor Herr Stephan Sinding. The reliefs in the ceiling of the portico have been designed by Herr H. Brasen, and modelled by Herr H. Ch. Petersen, the sculptor, who executed the statue of the Palace of Frederiksborg. The architect is Herr Blichfeldt.—The Danish Government has decided to construct new Customs Houses and free depôts in the city of Aarhus, the capital of Jutland. The cost is estimated at about 300,000 kr., and the structures will take three years to complete. The architect is Herr Kampman.—Several interesting ancient buildings are now in course of construction in Denmark. The old Helligaandskirke, or Church of the Holy Ghost, is being restored under the guidance of Professor Stork, the antiquarian architect, at a cost of 55,000 kr. The interior is to be restored in exact conformity with its appearance, &c., in the Middle Ages.—The Danish Minister of Culture and other authorities have visited Ribe Cathedral, the most important ecclesiastical edifice in Jutland, in order to make arrangements for its restoration, and improvement of the site.—In the town of Randers, Jutland, the ancient historical Helligaandskirke, or House of the Holy Ghost, famous as a monastery and hospital in the Middle Ages, is to be restored, and the market-square in its front enlarged and improved.—A historical museum has been established, after much labour, in the restored northern wing of the ruins of the old Castle of Koldinghus. It contains antiquities of much value.—The Danish Minister of Public Works has issued a circular calling upon all provincial authorities to assist in the preservation of ancient buildings, memorials, and remains, with antiquities found in the earth. There are now over 2,000 of the former in Denmark, all registered and preserved as Crown property.

**NORWAY.**—The Norwegian Association of Engineers and Architects has elected Herr Johan Rogstad, president for the ensuing year.—A business house erected by Herr Nissen, four stories in height, in the Rind Plads, is worthy of notice, as it has been painted with so-called "Munich colour," the building being the first in Christiania treated in this manner. It will be interesting to see how this colour will resist the rigid climate of Norway.—We referred recently to the project of erecting new premises for the Bank of Norway in Trondhjem, where its head-office is situated, and that only a limited number of architects was to compete for the designs and plans. It now appears that this is actually the case, and a well-known architect, Herr Henry Bucher, strongly protests in the *Morgenblad* against this course being followed with respect to a building of such national importance.—We also referred some time ago to a competition for Norwegian, Swedish, and Danish designs, for designs for a villa to be built on an island near Christiania for a Swedish operatic singer, which has attracted unusual notice in Scandinavian architectural circles. The jury consisted of three Stockholm architects, and they have awarded all the three premiums offered to Stockholm architects. The successful architect is Herr Folke Zettervall, Stockholm, who receives 800 kr.; the two other premiums were 400 kr. and 200 kr. There were received in all forty designs. These are now being exhibited in Christiania, and according to the *Teknisk Upplydning* the Swedish architects show a decided English-American influence in their style, whereas the Norwegians have mainly drawn from the old Norse timber structures. By these designs the chief characteristics may be traced a German training with the effects of both nations.—A large municipal church has been completed in the town of Skien, the ornaments being executed in Norwegian marble. The architect is Herr Berg.—A new museum is being erected in the town of Stavanger under a State grant.—In Christiansand

a new Governor's residence is to be built, at a cost of 55,000 kr. The first story will be executed in granite. The architect is Herr Fürst.—Herr Henr. Nissen has just completed designs and plans for a new Governor's residence in the Arctic province of Finnmarken.—The Norwegian Society of Engineers and Architects is strongly advocating the establishment in Norway of a technical high college with State grant, and the leading journals are echoing the demand.—The Storting has granted a sum of 38,000 kr. towards the restoration of the so-called "Munk's Church" in Stavanger and the Ustein Cloister Church, on the island of that name, two of the most interesting historical edifices in Norway. The plans for the restoration have been prepared by Herr Johan Meyer, architect, who will also carry out the work.

#### MISCELLANEOUS.

**LONDON STREETS AND BUILDINGS BILL.**—We are informed that the Bill promoted by the London County Council, the London Streets and Buildings Bill, has received the Royal Assent, and comes into force on January 1.

**A BLACK SEA-BALTIC CANAL.**—The Russian Minister of Communications is elaborating plans for the construction of a canal between the Black Sea and the Baltic through the rivers Dnieper and the western Dvina. The preliminary surveys have already been commenced. First, a canal is to be constructed through the lower course of the Dnieper; and, secondly, the river will have to be deepened where a port is to be constructed, for which is projected either of the two towns of Cherson or Kachowka. Part of the river Bug would also be included in the scheme.

**LECTURES ON GOTHIC ARCHITECTURE AT NEWCASTLE.**—In connexion with the University Extension, a course of lectures on "Gothic Architecture," by Mr. D. H. S. Cranage, M.A., has been arranged for at Newcastle-on-Tyne. The lectures, which will be delivered on Thursdays, will be given in the Theatre of the Literary and Philosophical Society, at eight p.m., preceded by a class at seven, and will commence on the 20th inst., and terminate on the 6th of December.

**BRADFORD HISTORICAL AND ANTIQUARIAN SOCIETY.**—Between fifty and sixty members of the Bradford Historical and Antiquarian Society journeyed to Malton on the 1st inst. They first visited St. Leonard's Church, and from thence they passed the site of the Roman encampment, and on to Old Malton. An inspection was made of the old Gilbertine church. Assemblying later at the west front, near the Norman doorway, Mr. T. C. Empsell, chairman of the society, introduced Mr. C. H. Channon, of Malton, who, in the course of a paper, said the most interesting feature of Malton, both from its historical associations and architectural beauties, was the Priory Church. The present building was but the fragment of a once glorious minster, but in ecclesiastical history it stood alone as the only existing church in the country founded by a purely English Order in which public worship is still held. It was founded by Eustace Fitz-John for Gilbertine canons in 1150, only two years after the establishment of that Order. St. Gilbert of Sempringham, the founder of the Order, he said, did not enter his own Order till several years after its foundation, and when he did so received the habit from his friend Roger, Prior of Malton, whom he appointed to succeed him as Master of the Order. Roger's name, he pointed out, was in the capital of the fourth pier on the north side of the nave, with the inscription:—"Rogerus Pri. Orate p. bon. Fratri Cari." The name was inserted (it is supposed as a sign of humility), and it is accompanied by a rebus—a bolt through a tun. Some of the Priors represented Malton in Parliament in the reign of Edward I. Having referred to the chartulary of the priory now amongst the Cotton MSS. in the British Museum, Mr. Channon exhibited plans and sections, giving full details of the church as it was and as it is, together with the monastic buildings, of which nothing remains but the crypt under the adjoining house called the Abbey. He traced the subsequent history of the Priory Church, and concluded with a reference to the recent restoration. After leaving the church the party proceeded to the crypt. The old Lodge at Malton was also visited.

**FAIR WAGES AND THE LEEDS CORPORATION.**—In May last the Leeds City Council ordered the report of a special committee upon wages and the subletting of contracts to be sent back to that body, in order that it might take into consideration the representations of employers and employed, with respect to what was set forth in the document. Since then the committee has had interviews with representatives of the Conciliation Board, the Chamber of Commerce, the Master Builders' Association, the Coal-masters' Association, and the Trades and Labour Council, with whom the proposals contained in the report have been discussed. The result is that the committee has decided to recommend certain alterations to be made. These are to be found amongst the stipulations to be imposed upon contractors. "In No. 2 the words 'with parents' are struck out. The contractor shall pay all workmen employed by him (in or about the execution of this

contract on any part thereof) wages, and wages for overtime respectively, at rates not less than the standard rate of wages in each branch of trade recognised in the district where the work or any part of it may be done." Nos. 2 and 3 will read as follows:—(2) "The contractor shall observe and cause to be observed by such workmen hours of labour not greater than the hours of labour—and also the conditions of labour—usually observed in such district, other than any condition that Union men only shall be employed." (3) "The foregoing conditions shall not apply to any trade or trades during the existence of a general lock-out in such trade or trades. The corporation shall be the sole judges as to whether such a general lock-out exists. Then No. 5 has been altered to read:—"The contractor shall, to the satisfaction of the Council, provide and keep proper books, in which shall be correctly and promptly entered from time to time the names of, and the wages paid to, and the hours of labour observed by, all workmen employed by him, and shall from time to time, when required, if the Corporation conclude they have reasonable grounds for believing that the above conditions are not being complied with, produce such books to the Town Clerk or Deputy Town Clerk, to inspect the same, and allow him to take copies of, or extracts from, such books, or any of them."—*Leeds Mercury.*

**OAK DOORS FOR THE GUILDHALL.**—A pair of oak doors have just been added to the main entrance of the Guildhall, at a cost of 200 guineas. They have been designed by Mr. A. Murray, the City Surveyor, in the fifteenth-century style.

**THE DWELLINGS OF THE POOR.**—The monthly meeting of the Mansion-house Council on the Dwellings of the Poor (of which the Lord Mayor is president), was held on Tuesday, Mr. John Hamer in the chair. The secretary read the report of the work, which showed that a special reinspection had been made of 319 houses in the Battersea district, where the number of defects had been reduced from 1,022 in the first instance to 417. Insanitary conditions had also been dealt with in Hackney, Islington, Bethnal-green, Shoreditch, Camberwell, Mile-end, Whitechapel, Poplar, Hampstead, Marylebone, Newington, St. George-the-Martyr, Clerkenwell, Wandsworth, Westminster, Strand, Clerkenwell, West Ham, Limehouse, Chelsea, St. Luke's, Lewisham, St. George's East, Rotherhithe, and the City. A closing order had been applied for in the case of twenty-two cottages comprising Jerusalem-gardens, Hackney, which were found to be in a very bad condition, most of the closets having no water supply. The London Health Laws compiled for the Council had been published and sent to the Press.

**THE READING-ROOM OF THE BRITISH MUSEUM.**

—Mr. J. Munroe, C.E., writes to the *Times*:—"Now that the Reading-room of the British Museum is closed for cleaning and repairs, I would, with your permission, call attention to the very bad air and insufficient ventilation of this public institution, both for the sake of the staff and the readers. Every other convenience has been provided there, good light, easy chairs, and so on; but good air, which is so essential to the health, especially of the brain-worker, and consequently to the value of his work, is denied. Many complaints are made of headaches and other effects of bad air amongst the readers, but students are proverbially negligent of such matters, and the evil is allowed to go on. The air is always heavy and foul in the reading-room, especially in the afternoon, but is worse on some days than others. The ventilation is defective, and should be improved as soon as possible. This might be done at a trifling cost by means of air propellers. There should be a constant renewal of the air in the room."

#### LEGAL.

**SCALES AND CAIN V. TREASURE & SON.**

At the Clerkenwell Police-court on the 30th ult. J. Scales, a bricklayer, and T. Cain, a labourer, summoned Messrs. Treasure & Son, the contractors for St. Mark's Hospital, City-road, for 93d. and 63d. respectively, in consequence of not being paid their wages at the expiration of one hour's notice of their intention to leave work. Messrs. Treasure's case was that there were between forty and fifty men on the works, of whom eleven bricklayers and seven labourers gave notice at 4 p.m. on August 22 of their intention to leave at 5 o'clock. At 5 o'clock they demanded their wages, but the foreman, not having sufficient money, told them that, under the rules agreed upon by the employers and workmen, if more than 10 per cent. of the men employed on any job give notice to leave they are not entitled to receive their wages till the following Saturday at noon, but if they liked to call the next morning, Thursday, at 7 a.m., he would have their money ready. On presenting themselves they were paid their wages in full up to 5 p.m. on August 22, but demanded one hour's pay for attending. This was refused, hence the present proceedings. The magistrate dismissed the summons in each case.

#### CAPITAL AND LABOUR.

**LOCK-OUT IN THE BOLTON BUILDING TRADE.**—An attempt to settle the dispute resulting in



## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

## COMPETITIONS.

Nature of Work	By whom Advertised.	Prize.	Designs to be delivered.
*School, Bromham-terrace	West. Harlepool School B. B. L. L.	First 600, and 400 between the next four	Oct. 31
*Museum for Antiquities, Cairo	Egyptian Government		Mar. 1, 95

## CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Widening Church and School, South. Hill, M. H. Kellett	do	do	Sept. 11
Central Pipes and Cables, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 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Albany-rd., f. 1,880; 70, 80, 82, 84, 88 and 90, Albany-rd., f. 1,700; 15 to 61 (odd), Albany-rd., f. 1,500; 5 and 7, Albany-rd., f. 1,500; 15 to 61 (even), Albany-rd., f. 1,780;—By A. & A. Field: 62 and 64, Hallance-rd., Homerton, ut. 65 yrs., g.r. 61, 68, 250;—By Newcomb & Co.: 1, 3, 5, 7 and 11, Brynwood-rd., Highgate, f. 1,910; 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 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1138, 1140, 1142, 1144, 1146, 1148, 1150, 1152, 1154, 1156, 1158, 1160, 1162, 1164, 1166, 1168, 1170, 1172, 1174, 1176, 1178, 1180, 1182, 1184, 1186, 1188, 1190, 1192, 1194, 1196, 1198, 1200, 1202, 1204, 1206, 1208, 1210, 1212, 1214, 1216, 1218, 1220, 1222, 1224, 1226, 1228, 1230, 1232, 1234, 1236, 1238, 1240, 1242, 1244, 1246, 1248, 1250, 1252, 1254, 1256, 1258, 1260, 1262, 1264, 1266, 1268, 1270, 1272, 1274, 1276, 1278, 1280, 1282, 1284, 1286, 1288, 1290, 1292, 1294, 1296, 1298, 1300, 1302, 1304, 1306, 1308, 1310, 1312, 1314, 1316, 1318, 1320, 1322, 1324, 1326, 1328, 1330, 1332, 1334, 1336, 1338, 1340, 1342, 1344, 1346, 1348, 1350, 1352, 1354, 1356, 1358, 1360, 1362, 1364, 1366, 1368, 1370, 1372, 1374, 1376, 1378, 1380, 1382, 1384, 1386, 1388, 1390, 1392, 1394, 1396, 1398, 1400, 1402, 1404, 1406, 1408, 1410, 1412, 1414, 1416, 1418, 1420, 1422, 1424, 1426, 1428, 1430, 1432, 1434, 1436, 1438, 1440, 1442, 1444, 1446, 1448, 1450, 1452, 1454, 1456, 1458, 1460, 1462, 1464, 1466, 1468, 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1802, 1804, 1806, 1808, 1810, 1812, 1814, 1816, 1818, 1820, 1822, 1824, 1826, 1828, 1830, 1832, 1834, 1836, 1838, 1840, 1842, 1844, 1846, 1848, 1850, 1852, 1854, 1856, 1858, 1860, 1862, 1864, 1866, 1868, 1870, 1872, 1874, 1876, 1878, 1880, 1882, 1884, 1886, 1888, 1890, 1892, 1894, 1896, 1898, 1900, 1902, 1904, 1906, 1908, 1910, 1912, 1914, 1916, 1918, 1920, 1922, 1924, 1926, 1928, 1930, 1932, 1934, 1936, 1938, 1940, 1942, 1944, 1946, 1948, 1950, 1952, 1954, 1956, 1958, 1960, 1962, 1964, 1966, 1968, 1970, 1972, 1974, 1976, 1978, 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, 2020, 2022, 2024, 2026, 2028, 2030, 2032, 2034, 2036, 2038, 2040, 2042, 2044, 2046, 2048, 2050, 2052, 2054, 2056, 2058, 2060, 2062, 2064, 2066, 2068, 2070, 2072, 2074, 2076, 2078, 2080, 2082, 2084, 2086, 2088, 2090, 2092, 2094, 2096, 2098, 2100, 2102, 2104, 2106, 2108, 2110, 2112, 2114, 2116, 2118, 2120, 2122, 2124, 2126, 2128, 2130, 2132, 2134, 2136, 2138, 2140, 2142, 2144, 2146, 2148, 2150, 2152, 2154, 2156, 2158, 2160, 2162, 2164, 2166, 2168, 2170, 2172, 2174, 2176, 2178, 2180, 2182, 2184, 2186, 2188, 2190, 2192, 2194, 2196, 2198, 2200, 2202, 2204, 2206, 2208, 2210, 2212, 2214, 2216, 2218, 2220, 2222, 2224, 2226, 2228, 2230, 2232, 2234, 2236, 2238, 2240, 2242, 2244, 2246, 2248, 2250, 2252, 2254, 2256, 2258, 2260, 2262, 2264, 2266, 2268, 2270, 2272, 2274, 2276, 2278, 2280, 2282, 2284, 2286, 2288, 2290, 2292, 2294, 2296, 2298, 2300, 2302, 2304, 2306, 2308, 2310, 2312, 2314, 2316, 2318, 2320, 2322, 2324, 2326, 2328, 2330, 2332, 2334, 2336, 2338, 2340, 2342, 2344, 2346, 2348, 2350, 2352, 2354, 2356, 2358, 2360, 2362, 2364, 2366, 2368, 2370, 2372, 2374, 2376, 2378, 2380, 2382, 2384, 2386, 2388, 2390, 2392, 2394, 2396, 2398, 2400, 2402, 2404, 2406, 2408, 2410, 2412, 2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2432, 2434, 2436, 2438, 2440, 2442, 2444, 2446, 2448, 2450, 2452, 2454, 2456, 2458, 2460, 2462, 2464, 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**RAILWAY (Herts).—**Accepted for the erection of a pair of villa residences, Mr. F. Wilson. Mr. C. P. Ayres, architect, 14, High-street, Watford. £1,000

**WALSALL.—**For the erection of new buildings, Queen Mary's Schools, Walsall. Messrs. Bailey & McConnell, architects. Quantities by the architects. £4,875  
 H. Willcock & Co., £4,875  
 R. Jones, £4,875  
 Barnaby & Sons, £4,875  
 H. Lovatt, £4,875  
 T. Rowbottom, £4,875  
 W. Hendrick, £4,875  
 J. Bowen, £4,875  
 J. Lynex, £4,875  
 Harley & Son, £4,875  
 Mallin, £4,875  
 W. Wistace, £4,875  
 W. & J. Webb, £4,875  
 W. Hopkin, £4,875  
 Guest & Son, £4,875  
 R. N. Hughes, Birmingham, £4,875  
 Ham (accepted), £4,875

**WATFORD.—**For the erection of school for 450 boys, with central hall, in the Levensden-road, Watford, for the School Board. Mr. Charles F. Ayres, Architect, 14 High-street, Watford. Quantities by Mr. W. Bailey.

Extra for hall faced with Arley bricks.  
 Brown & Sons, £4,150  
 J. G. Brown & Sons, £4,150  
 J. Dantley, £4,150  
 J. Payne, £4,150  
 W. H. Neal, £4,150  
 A. Kellert, £4,150  
 Foster & Dicksee, £4,150  
 Webster & Cannon, £4,150  
 Rensford & Sons, £4,150  
 C. & J. Waterman, £4,150  
 Gough & Co., £4,150  
 C. Wigg, £4,150  
 T. Turner, Ltd., £4,150  
 C. Eames, £4,150  
 Parnell & Sons, £4,150  
 Andrews & Sons, £4,150  
 F. Dupont, £4,150  
 C. Brighman, Watford, £4,150  
 Kerridge & Shaw, £4,150  
 (Architect's estimate, £4,400.)

\* Accepted subject to approval of the Education Department.

**WATFORD (Herts).—**For the erection of a hospital for infectious diseases, for the Watford Rural Sanitary Authority. Mr. Charles F. Ayres, architect, 14, High-street, Watford. £11,300  
 Andrews & Son, Watford, £11,300  
 \* Approved by the Local Government Board and accepted.

**WEYMOUTH.—**For alterations to bar, &c., "The Portland Railway Hotel," for Messrs. Hall & Woodhouse. Mr. A. L. T. Tilley, architect, 3, Cornhill, Dorchester. £133 10  
 J. Innes, £133 10  
 J. & H. Bagg, Weymouth (accepted), £133 10

**WOODFORD.—**Accepted for addition to "Clifton Cottage, Cleveland-road, South Woodford, Essex. Mr. Herbert Riches, architect, 3, Crooked-lane, King William-street, London, E.C. 1. W. Mundy £750

**WOODFORD.—**For the supply of 1,500 tons broken granite (Quenast) for the Local Board. Mr. C. Mathew, Surveyor, Board Offices, Woodford, Essex. £115 7d. per ton.  
 C. M. Manuelle, London

**WREXHAM.—**For the erection of class-rooms, &c., Rehoboth Wesleyan Chapel, Coedpoeth.  
 Samuel Moss, £200 0 0  
 Wm. Owen, Ruabon, £200 0 0  
 W. E. Samuels, £200 0 0  
 Thomas Williams, £200 0 0  
 \* Accepted.

#### TO CORRESPONDENTS.

H. & W.—J. H.—G. H. W. (amounts should have been stated).—C. J. (we cannot undertake to answer such questions).—J. B. (below our mark).

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications beyond mere news items which have been duplicated for other journals are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR, those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 12s. per annum PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c. 20s. per annum. Remittances payable to DOUGLAS FOURDRINER should be addressed to the Publisher of "THE BUILDER," No. 46, Catherine-street, W.C.

#### PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER," LONDON.

THE INDEX and TITLE-PAGE for Volume LXVI. (Jan. to June, 1894) were given as a supplement with the number for July 1st.

CLOTH CASES for Binding the Numbers, price 2s. 6d. each; also READING CASES (Cloth, with Straps, price 9d. each; also THIS SIXTY-NINTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence, are now ready. SUBSCRIBERS' VOLUMES, on long sent to the Office, will be bound at a cost of 3s. 6d. each.

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SITUATIONS VACANT, PARTNERSHIPS, APPOINTMENTS, SHIPS, TRADE AND GENERAL ADVERTISEMENTS. Six lines (about fifty words) or under, 6s. 6d.

Each additional line (about ten words) 1s. 6d. Terms for series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c., may be obtained on application to the Publisher.

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FOUR Lines (about thirty words) or under, 2s. 6d. Each additional line (about ten words) 1s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY. \* \* \* Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Postal Orders, payable to DOUGLAS FOURDRINER, and addressed to the Publisher of "THE BUILDER," No. 46, Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" cannot be guaranteed for any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the front Page should be in by TWELVE noon on WEDNESDAY.

#### SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO

WEDNESDAY MORNING. The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

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ESTABLISHED 1866.

## J. J. ETRIDGE, Jr.

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### Some Recent Books on Sewage Disposal.



ALTHOUGH England awoke to the necessity of considering the questions of sewerage and sewage disposal only about fifty years ago, there is some satisfaction in knowing that she

was, after all, the first to undertake in earnest the Augean labour. Our American cousins lay claim to superiority and to priority in a great many matters, but in this, at least, they are willing to yield us the honours. Our right to them is gracefully admitted by the authors of a new American book on sewage-disposal,\* "It is cheerfully conceded," the authors say, "inasmuch as the necessity for sewage purification first arose abroad, that consequently the foreign engineers had the opportunity to attack the problem first, and we may very properly profit by their experience." They began to profit by this experience as long ago as 1855, when the Chief Engineer of Chicago was sent to England to learn "whatever new or useful had been developed under the active agitation of sanitary questions which then prevailed in England." And they have continued to profit in the same way up to the present time. The book under consideration is further evidence of the fact, for a great part of it consists of abstracts and quotations from British sources. The Reports of Royal Commissions, the journals of our learned societies, and the books of English sanitarians, have all been freely drawn upon. But to this, it must be said, a great mass of indigenous American information has been added. The candour of the authors in acknowledging their indebtedness to previous inquirers, and the honourable way in which they quote their authorities, at once win the reader's favour. The following words of the preface give an idea of the nature of the book, while at the same time they exhibit the authors' frankness and modesty:—

It will be noticed that the amount of original

matter in the book is relatively small. This is partially owing to the use of the language of the authorities drawn upon, instead of veiling its identity under slight verbal changes. . . . In all cases the aim has been to present as clearly and yet as briefly as possible the best available information on the subject under discussion, and to indicate the sources of information. . . . We have assumed, in short, that the making of the ideal sewage-disposal manual is to some extent a matter of discreet editing.

Opinions may perhaps differ as to the manner in which some of the editing has been done, but every reader of the book will gratefully acknowledge the value of the large mass of information which the authors have collected. They have ransacked the journals of learned societies, and the reports of scientists, as well as books on all manner of subjects, from pisciculture to the construction of siloes. Very little indeed seems to have been overlooked. The latest authorities on the various branches of the question are quoted or referred to, and to complete the usefulness of the book in this direction lists of papers, pamphlets, and books are given in which the student will find further information on most of the points connected with sewage and its disposal.

But the very bulkiness of the information collected by the authors has proved a source of difficulty to them. The material has accumulated to such an extent that, like sewage-sludge, it cannot easily be disposed of. Here and there we find evidence that the authors have suffered from plethora of information; they have received more than they could assimilate, and lack of order and of perspicuity is the result. For instance, Chapter VI., entitled "Legal Aspects of the Case," is sandwiched between two chapters on "The Composition of Sewage Muds" and "Quantity of Sewage and Variation in Rate of Flow." The important subject of "Nitrification and the Nitrifying Organism," which ought to have been considered as a "first principle" or in connexion with irrigation or filtration, is preceded by a chapter on the discharge of sewage "into tidal or other large bodies of water," and followed by one on "Chemical Precipitation." The self-purification of running streams is discussed in no less than three different chapters, which also contain information on subjects as far apart as the sources of river-pollution and the money value of sewage, protective legislation, and the effect of sewage on sea fisheries. Again, Part I. of the book is entitled "Discussion of Principles," while Part 2 contains "Descriptions of Works," and yet we find that the plan and description

of the Boston Main Drainage are given in Chapter IX., and that the chief examples of the treatment of manufacturing-refuse are described and illustrated in Chapter XVI., both in Part 1. Other instances of disorder could be given, but we have quoted enough to illustrate our point. It may perhaps be urged that these are trifling or inevitable lapses. We do not agree with this view. They are not inevitable, for technical books on subjects perhaps equally abstruse and intricate can be found (few in number, doubtless), which are both lucid and orderly. They are not trifling, because the reader's attention is distracted by this repeated flitting from one subject to another and back again, and a thorough grasp of the whole is therefore attainable only with much difficulty.

The book, large as it is, has its limitations. "I. The use of privies and cesspools, II. Collection by pail systems, III. The pneumatic systems of Liernur, Berlier, Shone, and others," are not considered at all, "except that a short chapter is included in Part II., descriptive of the pail system at Hemlock Lake, N.Y.;" IV. Simple subsidence or sedimentation; and V. Simple filtration\* through some artificial substance, as coke, excelsior, or ashes," are not considered "any further than as useful adjuncts to the more positive systems of purification. Experience in England has amply demonstrated that they have little claim to be considered systems of purification by themselves." There remain for consideration, then, according to the author's classification, five methods of sewage disposal, namely:—

"VI.—Discharge of crude sewage into tidal or other large bodies of water.

VII.—Chemical precipitation.

VIII.—Broad irrigation.

IX.—Intermittent filtration.

X.—Electrolysis."

Electrolysis, however, which, according to the authors, "while promising good results, must still be considered as in the experimental state," does not appear to have been tried in America except on a very small scale indeed,† and, presumably in con-

\* It should be explained that by "simple filtration" the authors mean "simple straining"; the subject of filtration through sand and artificial filters occupies considerable space in the book, and is illustrated by reference to the extremely valuable experiments carried out for the Massachusetts State Board of Health four or five years ago.

† At Brewsters, a village of about thirty-five buildings, fifty-two miles from New York, an electrical treatment is in operation. It differs considerably from Webster's Electrolysis, which was tried at Crossness, and which has since proved so efficient in the well-known Salford trials. These trials are not mentioned by Messrs. Raifer & Baker.

\* "Sewage Disposal in the United States." By George W. Raifer, M.Am.Soc.C.E., and M. N. Baker, Ph.D., Associate Editor *Engineering News*. New York: D. Van Nostrand Company. London: Sampson Low, Marston & Company, Limited. 1894. Pp. xxviii, 598; 111 tables, 7 plates, and 116 illustrations in the text. (The preface, we may add, is dated June 1, 1893.)



sequence of this, it also is eliminated from consideration. The book therefore resolves itself into a discussion of the other four methods of disposal. Although the authors make no mention of it in their classification, a variety of broad irrigation should be mentioned (namely, sub-surface irrigation), seeing that a whole chapter (rather more than one page in length, be it said), is specially devoted to it, while three or four more pages are occupied with the description of its practical application at Lenox, Mass., and at the Lawrenceville (New Jersey) School for Boys.

As we have already pointed out, the book is divided into two parts: I. "Discussion of Principles," and II. "Description of Works." This is the arrangement previously adopted in a well-known English book, of which a second edition has just been issued.\* In this, Part I. contains "General Details," while Part II. is styled "Sewage Disposal Works in Operation." In the American book the description of works occupies rather less half the volume, in the English book rather more than half. As the American book, however, contains more than twice as much matter as the other, really more space in it is devoted to the description of works than in Mr. Crimp's book. Indeed, this American volume is a *magnus opus*; and in the space of one article it would be impossible to discuss the whole of the matters of which it treats. We have already indicated the general scope of it, and can only add the barest summary of its contents, together with a few comments on the main conclusions at which the authors have arrived.

Before entering upon a discussion of the actual methods of disposal, the authors rightly essay the consideration of the first principles of the subject. A short statement of the germ-theory of disease is illustrated by a long reference to typhoid fever and to various epidemics of that disease, but particularly to those at Lawrence, Massachusetts. An experiment made in connexion with this outbreak revealed the fact that typhoid bacilli of the sturdiest sort would live for three weeks, even in water kept nearly at freezing-point. This period would suffice for a stream, flowing only a mile an hour, to carry the germs about 500 miles. It is matter for congratulation, however, that in a running stream various causes, such as minute animals and plants, operate to prevent the pathogenic bacilli from attaining the undesirable longevity which they enjoyed in the experimental bottle.

The infectious diseases of animals and their relation to the diseases of human beings form the subject of the second chapter; but the communication of diseases by the milk of cattle which have drunk polluted water is not dwelt upon. This is followed by various reports on river-pollution, prepared at the instance of several State Boards of Health, Massachusetts being the first and the most consistent labourer in this respect. A valuable report was, however, made to the Connecticut Board in 1886 by Professor Williston, of Yale College, and his copious descriptions of various manufacturing processes and their refuse are quoted in full.

Chapter IV. is a hodge-podge of ingredients of various values—the self-purification of a running stream from the biological point of view, the manurial constituents of sewage, the money value of sewage, sewage-disposal works "not properly subject to franchise by private companies," the rational view of disposal into tide-water and fresh-water, &c. The most important part of the chapter is that devoted to the purifying action which minute animals and plants exert in streams, and the most important contribution to this discussion is a long extract from Dr. H. C. Sorby's valuable

paper in the *Journal* of the Royal Microscopical Society for 1884. Dr. Sorby's experiments led him to the conclusion—

That when the amount of sewage discharged into a river is not too great, it furnishes food for a vast number of animals who perform a most important part in removing it. On the contrary, if the discharge be too great, it may be injurious to them and this process of purification may cease.

The authorities of English towns have for ages had a childlike faith in the self-purifying powers of running streams. Their faith was somewhat shaken when the Rivers Pollution Commissioners wrote their memorandum on the Calder at Dewsbury with the river water instead of ink; but faiths die hard, and to-day there are hundreds of towns and villages which still cling to the old idea. The less faith that is put in the self-purifying power of a stream, the better will it be for the health and comfort of all who draw their water-supply from it or who reside near its banks.

Biological researches have thrown a wonderful light on the causes of the purification effected not only in water but also in soil and filters. The fact that a filter of coarse sand, treated at intervals with doses of crude sewage, will purify the sewage to a considerable extent, and at the same time remain clean itself for years, was inexplicable until the promulgation of the biological theory. The nitrification of sewage in soils, with which the name of Mr. Warington will always be associated, also depends on an innumerable company of these micro-organisms, intent on converting the dangerous organic impurities into harmless nitrates. This new theory of sewage-purification is fully explained in Messrs. Rafter & Baker's book by copious extracts from the writings of English scientists, and also from a long and interesting report prepared by Edwin O. Jordan and Ellen H. Richards, and presented to the Massachusetts State Board of Health in 1890.

Among the other preliminary matters treated of are the composition of sewage muds, and the quantity of sewage and the variation in rate of flow. Tables are given showing the average daily consumption of water in 195 cities of the United States. The quantity used per head is on the average considerably in excess of the amount used in England, and this is one reason why American sewage is so much weaker than English. The heaviest recorded rainfalls at various cities in the States are tabulated, and the difficult question of storm-water is discussed. The authors' opinion is—

"That in the great cities the quantity of water derived from the rainfall is so great that to hold it in storage and treat it becomes a practical impossibility. As a compromise, then, we could only hope to provide for treating the first flow of rain-water, which, as containing the bulk of the street-washings, may be looked upon as the most important. In this view we would provide for, perhaps, 5 to 10 per cent. of the maximum twenty-four hours' rainfall."

Taking all things into consideration, the authors come to the conclusion that:—

"When some form of purification is to be provided, a separate system of sewerage appears preferable to the combined system by reason of not only the greater ease with which the more uniform flow of the separate system can be treated, but also by reason of the materially reduced expense of such treatment."

This opinion is shared by most, if not all, English sanitarians, but the initial cost of separate sewers has prevented their complete adoption, except in comparatively few cases. In many towns, however, new streets are being sewered on the duplicate system, and in this way the increase of storm-water in the sewers is prevented. Mr. Santo Crimp, while in favour of the separate system, considers that it will generally be necessary "to take the drainage from the backs of the houses and from back-yards into the sewage sewers."

Chapter VIII. of Messrs. Rafter & Baker's book reminds us of the *puccero* pot of a Spanish housewife. Stray information on a great variety of topics has been thrown into it, and labelled, "General Data of Sewage

Disposal." It would be interesting to quote the fifteen heads under which this information is presented, as a further example of the authors' lack of order, but it must suffice to say that they range from "Sewerage-systems—Separate or Combined," to "The Composition of London Sewage," and from "The Data of Human Excrements," to "Quality of Material required for Intermittent Filtration." This chapter completes the discussion of what we have called the "first principles" of sewage-disposal, and leaves the way clear for a general exposition of the four chief methods of disposal to which we have already alluded.

The first method—"Discharge of sewage into tidal or other large bodies of water"—is illustrated by reference to the difficulties experienced at Chicago, where the sewage is turned into Lake Michigan, and to the success at Boston, the sewage of which is conducted to Moon Island (about 2½ miles from the city), and there poured into the sea at the ebb of the tide.

The second method is that of *Chemical Precipitation*, to which probably more thought and ingenuity has been devoted by sanitarians than to all the other methods put together. Patents almost innumerable have been taken out by sanguine inventors, in hopes to solve the sewage problem once for all by some magical precipitant. Mr. Slater, in his book on "Sewage Treatment, Purification and Utilisation," mentions several hundreds of patents relating to the chemical treatment of sewage. Mr. Santo Crimp describes twelve methods which have been adopted in England, while another recent writer, Mr. Thomas Wardle, whose book\* we have received, describes sixteen methods. Very few indeed of the numerous systems have been of sufficient merit to insure more than an ephemeral existence; but, on the other hand, there are undoubtedly in England to-day several methods in use which go a long way towards clarifying and deodorising the sewage, even although they do not purify it sufficiently for the effluent to be turned without further treatment into the nearest stream. Chief among these is the "International" process, in which the sewage is first clarified by means of the salts-of-iron precipitant called "ferozone," and the effluent then passed through filters of sand and polarite about 33 in. in total depth. This system is working well at Acton, Swindon, Hendon, and other places, and has earned the praises of many eminent chemists and sanitarians. It is described both by Mr. Crimp and Mr. Wardle, and has also been fully described and illustrated in these columns.† It seems strange, therefore, that no mention is made of it in a book of the dimensions of Messrs. Rafter & Baker's. Neither are the other chemical systems now in use in this country named therein, such as the Amines process, in which lime and herring-brine combine to precipitate and sterilise the sewage. We presume that these methods have not been tried in America, and that the authors have therefore thought it needless to draw attention to them; but in other parts of the book they have not preserved such reticence about distinctly British matters. Messrs. Rafter & Baker's chapter on Chemical Precipitation is, however, extremely useful. They declare (and this is almost as true of our own country as of America) that the really useful chemical agents for purifying sewage have dwindled to three or four—namely, lime, sulphate of alumina (alum), ferrous sulphate (copperas), and perhaps ferric sulphate. The results of the valuable experiments made four or five years ago at Lawrence, Mass., are given in several tables, and from these the authors have drawn twenty-six deductions, which would have been more telling if they had been better arranged. The use of

\* *Sewage Disposal Works*: a guide to the construction of works for the prevention of the pollution by sewage of rivers and estuaries. By W. Santo Crimp, M.Inst.C.E., F.S.I., &c. Second Edition, revised and enlarged. London: Charles Griffin & Co., Limited. 1894. Pp. xxv. 349; 30 tables; 37 lithographed plates, and 14 figures in the text.

\* "On Sewage Treatment and Disposal for Cities, Towns, Villages, Private Dwellings, and Public Institutions." By Thomas Wardle, F.C.S., &c. John Heywood: Manchester and London. 1893. Pp. xvi. and 496. 10 plates, and 57 illustrations in text.

† *The Builder*, April 13, 1891.



lime, with ferric sulphate, or aluminum sulphate, is said to be of very little benefit. Other deductions read as follows:—

"(17.) The practical difficulties of working the lime process renders (sic) the results in general inferior to those which may be obtained at the same cost in other ways.

(6.) The use of copperas alone is without much useful effect. . . .

(18.) Copperas and lime treatment is difficult in practice owing to the necessity for adjusting the quantity of lime, although when such adjustment is properly made a good result is obtained.

(9.) Other things being equal, ferric salts are preferable to ferrous salts. . . .

(21.) The results with ferric sulphate have been on the whole more satisfactory than those with aluminum sulphate.

(24.) By the use of a proper amount of either an iron or aluminum salt, from one-half to two-thirds of the organic matter of sewage may be removed. . . . With the process carried out in detail the effluent can be discharged into a running stream without producing a nuisance."

In juxtaposition to this last it will be interesting to place the authors' deduction, No. 14:—

"(14.) . . . The best of the various chemical treatments leave a relatively large number of bacteria in the effluent, together with such quantities of organic matter as may lead in a short time to the development of as many as were present in the original sewage. If any so left are disease germs, the effluent may be nearly as dangerous to public health as the original sewage."

The authors' conclusions are expressed in their deductions, No. 22 and No. 25:—

"(22.) By reason of (a) variations in the composition of sewage at different places; and (b) changes in price of the re-agents, it is impossible to say that one [chemical] treatment is universally better than another.

(25.) The incompleteness of the purification in comparison with the cost of the process will be likely to confine the application of chemical purification to narrow limits."

While every one will agree with the first of these two final conclusions, opinions will differ as to the last. Certainly in England the opinion seems to be steadily gaining ground that the chemical clarification and deodorisation of sewage, especially when this is of a foul nature, are necessary, although at the same time it is admitted that further treatment of the effluent, by filtration or irrigation, will be required. Into the author's careful and exhaustive discussion of filtration and irrigation, we cannot enter now.

Although comparisons are odious to the persons compared, they may be not only entertaining but useful to others. In reviewing the three books now under notice, it is impossible to avoid ascertaining and comparing the opinions expressed in each of them on the most important divisions of the subject under consideration. One of the questions, which naturally suggests itself is—What method of treatment does each book recommend? And a second question, born of years of animated discussion, quickly follows:—What does each book say about Broad Irrigation? We have searched for answers to these questions, and append them here as instructive, and also as showing how "doctors disagree." But in making this comparison, allowance should be made for the weakness of American sewage in comparison with English, and for variation in other conditions.

#### QUESTION.

Which method of sewage-treatment do you consider to be, on the whole, the best?

#### ANSWERS.

Messrs. Rafter and Baker.

"The most efficient means of purifying sewage yet known, intermittent sand filtration." . . . (p. 13.)

"In estimating the relative value of chemical *versus* [intermittent] filtration processes of purification, the practical question arises as to which process may be expected to furnish an effluent least adapted to support the life of bacteria. Experiments upon the effluents from the coarse-sand filters indicate that the organic matter remaining therein is in no case well-adapted to support bacteria. . . . Judging by chemical analysis alone, there is nothing in the effluents known, or even suspected by chemists, to be harmful. . . . Although not absolutely proven, there are nevertheless strong reasons for believing

that the effluents from *fine* sand filters are entirely free from bacteria of every sort and kind, and if, on further study, it turns out that this is true, so far as present information goes, there is no reason to be urged against drinking the effluents from such filters." (pp. 289, 290.)

Mr. Wardle.

"There can be no doubt that a chemical treatment by precipitation is the safest and cleanest method, especially if such treatment effects microbial sterilisation." (p. 42.)

"From all the information I have been able to obtain in this lengthened investigation and research, I am very strongly of opinion that the only safe method of sewage-disposal is first by chemical precipitation, then land (or other) filtration, and afterwards river or other water-course oxidation. Precipitation by chemical reagents removes much dissolved organic matter from the sewage, yet it leaves some for further disposal; land-irrigation removes much of this, but not all, as has been often enough shown in these chapters. The diminished proportion. . . is effectively dealt with by river oxidation." (pp. 249, 250.)

Mr. Crimp.

[Mr. Crimp, we may say, is extremely cautious. He almost invariably prefers to quote the Report of some Commission or the words of some eminent doctor or chemist, rather than state his own opinion. The nearest answer of his, which we can find to our question, is the following.]

"Notwithstanding the fact that . . . the chemical treatment of sewage has received the concentrated attention of the most eminent chemists, it is still recognised that, in order to produce a sewage effluent of any substantial degree of purity, land must be employed in some form or other, or the effluent must be passed through artificial filters." (p. 30.)

#### QUESTION.

What is your opinion of broad irrigation as a method of sewage disposal?

#### ANSWERS.

Messrs. Rafter and Baker.

"The opinion has been expressed frequently that broad irrigation will not, by reason of the large amount of labour required, and the relatively high price of the same, be generally used in this country. There will, however, be some exceptions to this in especially favourable localities, and in the case of such public institutions as asylums, almshouses, and reformatories, where labour may be furnished by the inmates without expense." (p. 225.)

"There are some fallacies in regard to sewage-farming floating about, which, while exploded many years ago in England, where they mostly had birth, are occasionally cropping up in this country with as much vigour as though they were new discoveries. One of these is that vegetables from sewage-irrigated farms are of necessity watery; another is that cows fed on sewage-grown grass give less rich milk than those fed on ordinary grass; and a third, which may be considered a corollary to the first two, that sewage-grown products are less healthful than those from an ordinary farm." (p. 234.)

"There is some reason for believing that well-managed sewage-farms are not only not unhealthful to the neighbourhood in which they are situated, but that they may be even in some degree the source of an increased healthfulness of the region immediately surrounding them." (p. 252.)

Mr. Wardle.

"I have not the slightest doubt of both the possibility and the probability of danger to cattle feeding on pastures irrigated by crude sewage, urban or suburban." (p. 326.)

"It is conclusively proved that disease germs are conveyed to the blood and milk of cows by feeding on such polluted vegetation—that is, vegetation in contact with sewage above ground." (p. 55.)

"May we not safely infer . . . that both milk and animal tissue must be vitiated by such pernicious influences, and, by being used as food, convey the virus and bacterial germs into the human economy, so causing zymotic and other forms of disease and a general lowering of health?" (p. 324.)

"The facts show incontrovertibly that many emanations (from sewage-irrigated ground) may be and are the cause of dysentery, diarrhoea, and typhoid fever." (p. 354.)

Mr. Crimp.

"That sewage possesses a certain manurial value is too well established to need comment, but whether that value can be profitably reclaimed by applying sewage to land must depend upon a variety of circumstances." (p. 142.)

"Briefly it may be said that, provided the area of land is sufficient for the purpose, and that it has been properly laid out, no nuisance need necessarily arise if the works are properly managed." (p. 143.)

"Although it would be rash to assert that under all circumstances sewage farming will not prove

inimical to health, the evidence in favour of any general condition of unhealthiness resulting from its proper application is altogether wanting." (p. 145.)

What is truth? We ask after reading the bold paradox of Messrs. Rafter & Baker, on the one hand, as to the positively sanitary properties of sewage-farms, and the equally bold statements of Mr. Wardle, on the other hand, who denounces them as hot-beds of disease and death. Mr. Crimp's caution again stands him in good stead—if the land is sufficient, and if it has been properly laid out, and if the works are properly managed, no nuisance "need necessarily" arise. The truth is that irrigation, and filtration, and precipitation may all prove good or bad according to circumstances. There must be a brain at the head of all sewage works, and constant care must be observed. It is the lack of thought and care which has in many cases brought one or other system into disrepute. Pope's dictum about forms of government may be applied almost as truly to methods of sewage disposal.

For forms of [treatment still] let fools contest,  
Whate'er is best administered is best.

Space forbids us entering into details respecting the descriptions and illustrations of sewage-disposal works contained in the second parts of Messrs. Rafter & Baker's and Mr. Crimp's books, and scattered throughout Mr. Wardle's work. The first two are much more complete in this respect than the last, the American book being of the three the most interesting to architects, as the methods of treating the sewage from several blocks of public buildings are described and illustrated. Among these we find that broad irrigation is adopted at the Hospital for the Insane at Worcester (Mass.), at the Massachusetts Reformatory, Concord, and at the Rhode Island State Institutions. Intermittent filtration is in use at the Massachusetts School for the Feeble-minded, and (in conjunction with broad irrigation) at the London (Ontario) Hospital for the Insane; sub-surface irrigation is adopted at the Lawrenceville (New Jersey) School for Boys, but the results are not quite satisfactory; and chemical precipitation, followed by intermittent filtration through land, has recently been adopted for the Rochester (Minnesota) Hospital for the Insane.

In conclusion, Messrs. Rafter & Baker's important volume contains a large mass of useful information, culled from the best authorities and gathered from actual inspection of executed works. The authors have carefully weighed all the evidence available, and in no case have they leapt to a hasty conclusion. The book is excellently printed on good paper, and the illustrations are remarkably clear and complete. The misprints are few and far between; we may, however, draw attention to the fact that the four illustrations on pp. 289-291 are wrongly numbered in the letterpress. There is a good index. The book will undoubtedly prove a valuable work of reference, although, on account of the lack of order displayed in Part I., it is not quite as interesting to read as it might have been; we trust that the authors will be able to remedy this defect when a second edition of the book is called for.

Mr. Crimp's "Sewage Disposal Works" has already attained the dignity of a second edition, and its author can therefore look with equanimity upon the remarks which reviewers may be disposed to make respecting it. This edition contains various alterations and additions which bring the theoretical part of the book up to date, and important chapters have been added in Part II. on the Sewage-Disposal Systems of London, Berlin, and Margate. It is, as the title of the book implies, with the practical part of the subject that Mr. Crimp mainly deals, and we have no doubt that engineers will give as cordial a welcome to this edition as they gave to the first. The book contains a good index, but at least one omission ought to be rectified—*sub-irrigation* is not mentioned in it, although described (very briefly, it is true), on p. 194.



While Messrs. Rafter & Baker may be said to write as sanitary *litterateurs*, and Mr. Crimp as an engineer, Mr. Wardle undoubtedly writes as a chemist. His book deals principally with sewage-disposal in its biological and chemical aspects, and (of course) his own Ozonine-Ferrium Process obtains long and favourable notice, apparently, however, not undeservedly. From the extracts we have already made, it will have been gathered that Mr. Wardle does not observe the caution which is so characteristic of Mr. Crimp, but proclaims the dangers of irrigation and the blessings of precipitation with considerable vigour. The book, however, is marred by a great number of misprints, of inelegant and inexact expressions, and of ill-constructed sentences. On p. 92, Swinton is said to have a population of 24,000, and a sewage-flow of "about 240,000 gals. daily, or 15 [sic] gals. per head of population;" on the same page the filter-beds are said to have "four pipes" (instead of "four-inch pipes"), and to be capable of filtering "650 gals. of effluent per twenty-four hours." What becomes of the other 200,000 gals. Mr. Wardle does not say. On the following page we are told enigmatically that "the total working expenses amount to 420*l.* per annum, or about 6*½*d. per head of the population, which is a very low rate, as it is well known generally that the sewage can be treated at a total inclusive cost of 1*s.* per head." What this sentence means we do not quite understand, but the error in the cost per head is manifest, —420*l.* divided by 24,000 gives 4*½*d., and not 6*½*d. The numbers of twenty-one answers on pp. 174 and 175 do not correspond with the numbers of the questions. "Bacillae" occurs on p. 316. On p. 229 Mr. Wardle declares that "upwards of" sixty sewage-works have been described in chap. xiv.; he means "nearly," for only fifty-five have been noticed. Here are a few choice sentences:—

"The effluent [from precipitation tanks] should be so purified as to be fit to turn into a river containing at least eight volumes of water to one of effluent without having been previously used for irrigation," p. 236. "Should it be deemed advisable to remove what is called the storm-water from the sewers, by which is meant both storm-water and that from ordinary rainfall, I am convinced that, generally speaking, only actual storm-overflows need be diverted," p. 357. "Cultivated by a proper rotation of rye-grass, three-years' roots, one year cereals, one year the latter without sewage," p. 38. "My experience of sewage farms is that they are more or less of a nuisance, with rare exceptions, owing to exceptionally careful management!"

On page 296, Mr. Wardle speaks of some "immensely minute" micrococci, and is guilty of the inelegant expression "and so thus there are." We are told on page 360 that Manchester has "a fairly good water-supply of excellent purity." Many other instances could be quoted to show the carelessness with which the book has been prepared for the press, but we have said enough. We regret that these blemishes appear, for they tend to bring discredit on a book which contains much useful information, and which is evidently the outcome of reading, observation, and experiment extending over several years.

**SURVEYORSHIP, RICHMOND (SURVEY).**—At a meeting of the Town Council of Richmond held on the 11th instant, the Town Clerk reported that 123 applications had been received for the appointment of Borough Surveyor. The applications were referred to a sub-committee, who will select a certain number of candidates to come before the special meeting of the Town Council to be held on the 25th instant, upon which date it is anticipated the appointment will be made. It was further resolved to present the retiring Surveyor, Mr. E. J. Lovegrove (who takes up his duties at Horsney on the 29th instant) with a sealed illuminated testimonial, together with a cheque for 100 guineas, as an acknowledgment of the value of the services he has rendered to the Borough and the Council.

\* The italics are ours.

## NOTES.

**T**HE tendency to a great activity in "improvements" on the Bedford Estate seems to be taking a form which may have a very prejudicial effect on what is at present said to be the healthiest district in London. A great many tall buildings for houses in flats have recently been erected on sites between Gower-street and Tottenham Court-road, which, if fully occupied, must considerably increase the population per acre in this part of Bloomsbury; but these are entirely out-done by a huge block which is just being completed in Charlotte-street, between Bedford-square and Oxford-street. How much these buildings have injured the adjacent old-fashioned houses in the matter of light and air may be imagined, but a more serious aspect of the case is that if this kind of thing is to go on, the population on the estate must inevitably be increased (if all these flats let) to a point a great deal beyond what on sanitary grounds ought to be permitted. Ground has been cleared for another large rebuilding in Russell-square, and there is every reason to fear that the same policy will be pursued here. If this goes on, the architectural effect of the old Bloomsbury squares, which in its way is quiet and pleasing, will be entirely spoiled; but the more serious point is that the neighbourhood will be dangerously overcrowded in the effort of the ducal landlord (or of his enterprising estate agent) to screw out of the land the utmost return that can be got from it. The matter is of serious concern to a large district of London. Bloomsbury is now, for residential purposes, as thickly planted with houses as it can be consistently with due regard to sanitary conditions. To say that no more square yards of ground are occupied by the new buildings that are going on is nothing to the purpose. It has long been recognised by sanitarians that you cannot crowd more than a certain number of persons on a certain space of ground with safety to their health, and whether they are crowded together horizontally or piled above each other vertically makes little difference in a sanitary sense. Something ought to be done, on public grounds, to put a check to this over-building. To appeal to the conscience or sanitary perception of the Bedford estate office would, of course, be useless.

**A**FTER much unfortunate controversy the site for the great National Industrial Exhibition which is to be held at Berlin in 1896 has now been definitely decided on, and the preliminary plans of the architect passed. Herr Hoffacker, who is quite a recognised specialist in exhibition work, Herr Bruno Schmitz, of competition fame, and Herr Griesebach, a representative of the most modern school of Berlin architecture, will jointly act as advisers of the Exhibition executive. As there is ample scope and a liberal exchequer, it is to be hoped that the three architects will be able among them to produce a fine example of an exhibition building. If we understand rightly, full advantage is to be taken of the river frontage, on which a number of minor buildings are to be erected. The main block will probably cover about 50,000 square metres. The Crystal Palace covers approximately the same ground, whilst the superficial of the Palais de l'Industrie at Paris is just about half this.

**T**HE Cathedral of Parenzo in Istria, near Trieste, is known by repute at least to all architectural students as one of the most interesting buildings in Western Europe. It was built by Bishop Euphrasius in the time of the Emperor Justinian, and is a very complete example of an early Christian church of the basilica type. It closely resembles the two famous basilicas at Ravenna, but differs from them to the extent that the basilica at Parenzo retains the octagonal

baptistry and the square tower at the western end, which the Ravenna churches have lost. The mosaics are of singular beauty and completeness; they have, until lately, been ascribed to the thirteenth century, but are now believed to be of the same date as the church itself. The mosaics in the half-dome of the central apse at the west end were uncovered about four years ago, and have a dedicatory inscription by Bishop Euphrasius in Roman uncials. Cav. Boni, of the Department of Antiquities and Fine Arts at Rome, has recently published a pamphlet reprinted from the *Archivio Storico Veneto*, illustrated by a series of photographs, descriptive of the cathedral and the mosaics, a copy of which is in the Library at South Kensington, and is worthy of the attention of every student of art. It is a subject for great regret that these unique mosaics are being "restored" in a manner which will go far to destroy their archaeological, as well as their artistic, value. Cav. Boni, in his pamphlet, describes the treatment to which these decorations have been subjected, and contrasts it with the admirable manner in which the mosaics in the apse of San Giusto at Trieste were preserved from imminent destruction without impairing their authentic character, as related by Mr. T. G. Jackson in his "Dalmatia, the Quarnero, and Istria" (iii. 364).

**I**N the new number of the American "Journal of Archaeology" (1894—2), Mr. A. L. Frothingham calls the attention of students of architecture to a very curious dome structure discovered at Vetulonia, in the artificial tumulus known as La Pietrera. The general arrangement of this hypogeum is analogous to those of the Mycenaean funeral structures of the "beehive" type; but there is one fundamental difference, which marks the Vetulonia tomb out from all similar structures, both in Greece and Italy, and that is that in all these the circular dome building begins from the foundations, whereas at Vetulonia the ground plan is square. A secondary difference is that in Greece the slant of the circular walls begins at once, whereas at Vetulonia the square walls are exactly vertical till they reach the base of the dome, and the dome itself is not so sharply pointed as in Greece. In neither case, as Mr. Frothingham points out, have we a true dome, but in the Mycenaean structures we have the prototype of the Pantheon, while at Vetulonia we have a forerunner of the more advanced Byzantine dome on pendentives. The problem remains—why at Vetulonia have we the combination of the dome on the square ground plan? The dome tomb is a natural form growing out of the necessity of supporting the pressure of the superimposed earth. All tradition was in its favour. Two hypotheses are suggested to account for the square plan; 1. The ancient Italian tomb-chamber was rectangular, and the new-comers settling in Italy came under the influence of certain religious ideas connected with the form, and adopted it (this seems a little far-fetched). 2. The adoption of the square ground-plan had an earlier origin outside of Italy, in the East, and the tomb of Vetulonia may be lineally connected with squares halls of Assyrian palaces covered in by domes. The same number of the journal gives an account of the Boston Museum of Fine Arts, apropos of the publication of a catalogue of the Greek, Etruscan, and Roman vases. It will surprise many to hear that the Boston Museum contains a fine representative collection of Greek ceramics, amounting to no less than 866 pieces, of which 144 are from Naukratis. These last were presented to the Museum by the Egypt Exploration Fund in acknowledgment of American subscribers. The collection is especially rich in Attic vases of the black and red figured styles. The weak point of the collection is the absence of any specimens of ware from Hissarlik and Thera. The catalogue has a good preface on the history of Greek vases, and an account of the process of their manufacture.



THE *Archaeologischer Anzeiger* for 1894 (pages 1-23) contains an elaborate and fully-illustrated discussion of the Sidon sarcophagi by Dr. F. Winter. It deals chiefly with the question of the relative dates of seven chambers with the seventeen sarcophagi. The oldest, according to Dr. Winter, are the "Lycian" and the Satrap sarcophagi—he dates both as belonging to the fifth century B.C. The sarcophagi of the "mourning women" is roughly contemporary with the sculptures of the mausoleum at Halicarnassus. These wonderful monuments were made, he thinks, not originally at Sidon, but probably at Athens, and were afterwards brought to Sidon. Of the scenes depicted on the famous "Alexander" sarcophagus no precise interpretation is as yet offered. The account is prefaced by a very complimentary notice of the activity of Hamdey Bey and his work in relation to the new museum at Constantinople.

THE German architectural journals seem to be well satisfied with the success of the ninth biennial gathering of architects at Strasburg. After the business meeting of the delegates of the allied architectural societies, to which we referred last week, the "Congress" was formally opened by the President, whose address was most enthusiastically received. Some four hundred architects were present, and the local authorities were well represented. As usual, the sight-seeing, banqueting, and amusements were the chief features of the gathering, but these were exceedingly well arranged, and the city certainly afforded ample opportunities for an instructive as well as pleasurable stay. Among the papers read were a description of the development of Strasburg, by Herr Ott, and two by Messrs. Barkhausen and Lauter, on the training of the younger generation of German architects, which led to an excellent discussion. Of the various excursions arranged, one to the neighbouring Colmar was much appreciated. Among non-German architects attending the Congress we notice the names of Herr von Gruber, of Vienna, and Herr Ritter, of Zurich. The Society of German Engineers have this year held their thirty-fifth annual gathering at Berlin, where a special engineering exhibition was arranged for the occasion. As the Society counts no less than ten thousand members, of whom some one thousand five hundred attended, the meeting was a very representative one. The exhibition, however, was practically only a re-arrangement of the German engineering exhibits sent to Chicago. The repetition was so complete that even the old Chicago catalogue was re-used.

A UNION of railway men at Buffalo, in the State of New York, has just brought an action against its officials for the payment of strike money claimed to be due. During the strike on the Lehigh Valley Railroad last year, the local branch of the Order of Railway Conductors, at Buffalo, was ordered out by the National or Central officers of the organisation. The men obeyed the order, and, when the strike was over, they presented their claims of pay for the time lost. The central body of the organisation rejected the claims, and now forty-seven members of the Buffalo branch have entered separate suits against the Order for the recovery of from 200 dols. to 250 dols. each as strike pay. The defence set up illustrates the tendency amongst American trade unions to evade anything like responsibility before the law. The head of the Order of Railway Conductors argues that, if the Order had made any contract with the members to pay them their salary for quitting their employment under the circumstances, such contract was against public policy and in restraint of trade, and, therefore, void. The defence also pleads that the Order is not incorporated, and cannot be sued. The case is naturally exciting unusual interest

in the United States, because it develops an entirely new feature of the trade union question. The rules of all American labour organisations require local branches to quit work at the order of the national officers. If it should become an established fact in the United States that the members of a local branch can turn to the central body for the recovery of monetary losses experienced in strikes that have been duly ordered, it will make a radical change in trade union movements, and general strikes at the bidding of individuals would become a thing of the past.

THE Report of Dr. Bruce Low to the Local Government Board on an outbreak of anomalous illness in the Parish of Laxfield, Suffolk, is mainly concerned with the purely medical aspect of the problem, nor is the illness connected definitely with any special sanitary defect in the parish. But the general conditions of Laxfield, as briefly set forth in the report, seem decidedly favourable to the development of ill-health. The water supply of the village is provided for somewhat more systematically, it is true, than in many rural parishes. Surface water from adjoining fields is collected in a deep pond or reservoir, situated at the higher end of the village, and adjoining the high road, whence it is conveyed by a pipe to a filter bed consisting of layers of charcoal, sand, and gravel to a depth of 3 ft. The water after passing through this filter-bed is piped to a well or tank, situate near the middle of the village, and provided with a pump. The villagers have to fetch from this pump what water they require for domestic use. At the date of Dr. Low's first visit, April 17, the filter-bed had not been cleaned out, or the materials renewed, for two years. The water supply ran short last year during the summer months. There is no proper sewerage. Some drain-pipes are laid behind houses to convey away slop water, which finds its way sooner or later into the brook. Excrement disposal is by means of cesspit privies emptied at long intervals. Refuse disposal is by means of uncovered ashpits, often little better than holes dug in the backyards. The contents of these ashpits are from time to time disposed of upon garden land or allotments by the occupier. The dwellings are fairly good, though here, as in other rural districts, there is often noticed a reluctance to properly ventilate bedrooms by opening the windows during the daytime. This is a drawback to health in the dwellings of the poorer classes both in town and country against which the only practical influence is that of better education, which will have its effect in time.

A LARGE house is being built at Jordans, for Mr. Ritchie, by Mr. H. Flint, of High Wycombe, contractor, after, we are informed, Mr. Macartney's designs. Jordans is a site of some interest. It lies about midway between Chalfont St. Giles and Beaconsfield, in what has been termed "Puritan Buckinghamshire." In the wooded hollow, and screened by Wilton Park Woods, stand Stone Dean and the Quakers' Meeting-House, with its burial-ground. The Meeting-House, built temp. James II., and the graveyard, about half an acre in extent, have long been an object of pilgrimage to Americans and members of the Society of Friends. For there are the graves, distinguished by modern head-stones, of William Penn, founder of Pennsylvania (1718), his two wives, Gulielma (1693) and Hannah (1726), and five of their children; of Springett Penn (1696), William Penn's eldest son; of John Penington (1710), Isaac Penington (1679), Mary Ellwood (1708), and her husband, Thomas Ellwood (1713), the friend of Milton and Penington, and who, when living with the Peningtons at Bottrells, took for Milton, in 1665, what he calls in his own "History": "a pretty box . . . in Giles Chalfont, a mile from me." Entries of these

interments, and of several whereof the graves cannot be identified now, are made in the registers of Chalfont St. Giles' parish. William Penn lived at Horningsgate, six miles distant, afterwards at Worthingurst, Sussex, and then at Ruscombe, near Twyford, in Berkshire. From these places, members of his family were brought to Jordans for burial. His first wife was a daughter of Lady Springett, who had married Isaac Penington, of the Grange, Chalfont St. Peter. It is often stated that he lived at Stoke Poges; but the property there was bought by his second son, Thomas; James Wyatt built the Manor House, now Stoke Park, circa 1799, for John, son of Thomas. It was Ellwood who acquired Jordans from William Russell in 1671, as a burial-place for the Society; in 1748 the graveyard was enlarged, by the gift of Samuel Vandewall, whose family vault may be seen on the higher ground beneath the trees.

A WORD may be added here in special reference to Milton's home at Chalfont St. Giles. The six-roomed half-timbered cottage, being one of two back-to-back tenements formerly owned by the Fleetwood family of The Vache, has been carefully repaired by Mr. J. Oldrid Scott. The cottage has been saved, by public subscription, from the Americans, who, however, could not have taken with it the pretty garden and the open prospect up the rising Dean (or Dene) Way, and so to a picturesque group of old houses at Three Households. The small low kitchen, with its old fireplace and quaint little side larder; the larger sitting-room across the passage—these suffice to us to picture to ourselves the blind poet's domestic life at Chalfont, where he gave Ellwood a manuscript of "Paradise Lost," and, it is supposed, wrote his "Paradise Regained"; and our picture is very different from that presented by the room as now prepared for visitors. We prefer to think of Milton as he lived; we can well spare the old pikes and Cromwell's cannon-balls. The parish church, built of flint and squared blocks of clunch, contains features of all the styles from Late Norman to Perpendicular. In or about 1220 the chancel, which inclines to the south, was lengthened; the fabric was restored by Street in 1861-3, and by Mr. J. Oldrid Scott in 1889. In 1883-4, Mr. J. P. Seddon extended the south aisle eastwards for an organ-chamber. On the east wall of the south aisle, and just over the William Gardiner altar-tomb (1558-60), is a marble tablet set in blue and green mosaic foliated work, in memory of Milton.

THE scheme of papers for the next session of the Architectural Association promises to be of more than usual interest and variety, both on the artistic and practical side. Mr. Walter Crane on "The Influence of Architectural Style on Design"; Mr. Beresford Pite on "The Study of Modern Architecture"; Mr. Stirling Lee on "The Use of Sculptural Decoration at the Present Time"; Mr. C. W. Whall on "Painting and its Relation to Architecture"; these are announcements which ought at all events to secure the full attendances that are so much desired. Among more practical subjects Mr. Keith D. Young is to treat of "Sanitation in regard to Hospitals and Infirmarys"; Mr. E. O. Sachs is to read a paper on "The Modern Theatre of the Continent," a subject which he has made a special study; Mr. John Slater contributes a paper on "Bricks," a practical subject on which there is an immense amount to be said; and "specifications" are to be treated on one evening "from a builder's point of view," by Mr. Holloway, and "from an architect's point of view," by Mr. E. C. Pinks. This last couple of papers ought to be both interesting and instructive to those who have yet to familiarise themselves with the practice of specification-writing.





Old "Swede's Church," Wilmington, Delaware: North-West View.—From a Sketch by Mr. E. Eldon Deane.



Old "Swede's Church," Wilmington, Delaware: South-West View.—From a Sketch by Mr. E. Eldon Deane.



# HOLY TRINITY CHURCH, WILMINGTON, DEL.

THIS picturesque church (formerly Holy Trinity, Christina, Pennsylvania) was erected by the Swedish Lutherans and set apart for sacred use in the year 1699. It is recorded that at the time of its erection, such of the people as were too poor to contribute to the building fund lent their physical energies to the work, the women carrying the mortar in their aprons. Rev. Eric Bjork, its first minister, was recalled to Sweden in 1714 by order of Charles XII., and appointed pastor of the church in the mining town of Fahlun and provost of the district. We may surmise it was by his interest that the mining company of Fahlun presented, in 1718, the handsome church-plate comprising chalice, paten, and pyx, which are still in use—though after the Anglican ritual. This, and the Gloria Dei Church in Philadelphia, are two of the old Swedes' churches that, after the Revolution, came under the control of the Episcopal Denomination.

E. E. D.

# THE HYGIENIC CONGRESS AT BUDAPEST.

THE eighth Congress of Hygiene and Demography, which has been held during last week and part of the present at Budapest, appears to have been as successful in regard to the numbers attending and the general interest in the proceedings as was expected, though the number of attendances has not equalled that of the London congress, the best attended of any that have been held. The number of English professional men, however, attending the Budapest congress has been larger than at any previous congress held in a Continental city. The influx of visitors was divided between many countries, North and South America, as well as Europe, Asia, and Africa, sending their contingents of representatives. Great Britain sent no official representatives of the Government or any of its departments, but the leading universities, colleges, and learned societies sent as delegates some of their most distinguished members. The Institute of British Architects was represented by three of its Fellows, Mr. T. W. Cutler, Mr. John Slater, and Mr. Arthur Cates; the Surveyors' Institution was represented by Mr. T. Blashill, Architect to the London County Council, and Mr. Arthur Cates; the Sanitary Institute by Sir Douglas Galton, Professor Corfield, Mr. Cutler, Professor J. Lane Nottter, and Dr. John Sykes. Sir Douglas Galton, who was nominated also by the Institution of Civil Engineers, the Royal Society, and the Society of Arts, was unable to be present, but was a contributor of several important papers. Professor Roger Smith represented King's College, the London School Board, and the British Institute of Public Health. Professor Banister Fletcher represented the Corporation of London; Mr. Baldwin Latham, the Royal Meteorological Society; and Professor Victor Horsley, the Royal Institution. The medical profession was, of course, largely represented. Among English architects present there were also Mr. Aldwinckle and Mr. Locke Worthington. In one respect a disappointment awaited the Congress at the outset. Dr. Joseph Körösi had found that the subject for which he offered a prize of 1,500 francs for the best work on "Demography: its Progress in the Chief Countries of Europe and America," had branched out into so colossal an enquiry that three years would be too small to be devoted to the subject. It has been decided to divide the subject into three parts—I. The statistical aspect of demography from the point of view of the census, II. Natal statistics, III. Mortal or death statistics. Each branch will be given for competition at a different Congress, Branch I. at the next Congress in 1897, with two years interval of preparation; II. in 1900, with a similar interval; and III. in 1903.

An enormous programme of work had been provided, over 800 papers on the various subjects having been forwarded, of which about 10 per cent. were in English, from either the United Kingdom, the British Colonies or possessions, or the United States. The sittings of the Congress are held in a series of seven nearly contiguous buildings, forming the museum and class-rooms in connexion with the Polytechnicum and the Crown Park—and it was in one of the central blocks in the vicinity of the park that the "Fête de Welcome" on Saturday night, September 1, was given. The Hungarian Home Minister, Mr. Charles Hieronymi, received and welcomed the visitors. The ceremonial opening of the Congress

took place on Sunday morning, when the brother of the Emperor-King, Archduke Charles Louis, was present on behalf of the Emperor, who was the patron of the Congress. At the Polytechnicum, the central building of the group in which the Congress was held, was an exhibition of objects illustrating the progress of sanitary science.

The real work of the Congress commenced on Monday the 3rd with the sitting of the sections. To facilitate the huge business, the central building of the Polytechnicum was disposed in offices, conversation-room for meeting of members, a long room with a staff of clerks and interpreters, in which each member found at a certain spot, indicated by the initial of his name, the papers, tickets, books, or other objects he is entitled to receive. Certain of the sections, indicated on a plan published in a daily conference journal, met in the upper rooms of this central building, and on passing through the court-yard the other sections were to be found in various other buildings of the Polytechnicum, indicated by enormous alphabetic letters. The business of the sections was supposed to commence at nine o'clock, but in most, the machinery not being on the first morning in perfect going order, there was some delay. In section 1, devoted to bacteriology, there was a large attendance, and it was evident that throughout the Congress this would be one of the subjects which would be most closely followed. Unfortunately the printed abstracts of papers were in but few instances available during the morning sittings.

Into a large portion of the proceedings of the sections we cannot of course enter. The discussions and papers in Section I., on the first day, for example, were too completely medical and chemical for our columns. In the course of the simultaneous proceedings in Sections II. and III., on typhus, small-pox, and diseases prevalent in the tropics, Mr. Ackworth read a paper by Miss Nightingale on "Village Sanitation in India," and Professor E. Lane Nottter, of Netley Hospital, one on the "Hygiene of the Tropics." Miss Nightingale suggested a resolution in favour of Government help to improve the sanitation of Indian villages, a matter of more than local interest, as epidemics often arose from such villages, and spread far and wide. This suggestion was adopted, and it was further suggested that systematic endeavours should be made to instruct the native population in the simplest elements of sanitation. The most pressing need, it was stated, was the supply of wholesome and pure water, and the removal of refuse and insanitary matter from the neighbourhood of the dwellings.

Mr. Ackworth's paper described the arrangements made by the Metropolitan Asylums Board for isolating and treating small-pox patients in the metropolis on the group of three ships off Erith, of which the principal one is the twin-ship *Castalia*. In any extension of that accommodation which the future would inevitably render necessary, it was not proposed further to extend the system of hospital ships, but to obtain a riverine site in the vicinity, where a hospital, combining all the modern improvements, could be built. There were three principal reasons for not extending the hospital-ship system—1st, a ship as a structure was less stable than a building on land; it might take fire, or be destroyed by a collision or a gale; 2nd, it was impossible thoroughly to disinfect a ship without an entirely new equipment of fittings periodically, as had to be done in the case of emigrant ships, by the rules of the Board of Trade; and 3rd, the extension, if proposed, would give great umbrage to the traders and merchants of the port of London, who would rise in arms against it.

In the fourth Section three papers in French, one in German, and one in Hungarian were read, dealing with the health of workmen as affected by their hours of labour and their habits. The Hungarian, Mr. Axmann, of Budapest, in addition to the hours of labour question, discussed the extent to which accidents to workmen were due to the use of alcoholics, and he carried the following resolution:—

"Considering that 60 per cent. of the accidents happening in factories and workshops are caused by the use of alcoholic drinks, the attention of all Governments ought to be called to this fact. Dr. Axmann proposes that the price of drinks such as beer, which are less harmful, should be lowered as far as possible, whilst that of strong intoxicants should be raised high enough to render their consumption more difficult."

In Section V. nine papers dealing with infant mortality, and in Section VI. nine upon the physical education of school children were read, the most remarkable of which was one forwarded by Sir Douglas Galton; but as these dealt with physical education rather than sanitary conditions

of school-building, they are out of our range." In Section VII. Mr. de Courcey Meade read a paper on the "Practical Ventilation of Sewers in Towns," and Mr. H. Robinson one on "Sewage Water and Purification by Filtration." A paper advocating a new system of separating the solid fecal matter from the liquid, for the purpose of obtaining a strong manure on one hand and a comparatively pure effluent on the other, was read by a Russian engineer, M. Nadeine (of St. Petersburg). In this system the flush of water is used to set in motion a sort of little water wheel fixed under the closet-pan or sink, which at once separates automatically the solid fecal matter from the liquid, the two streams falling severally upon peat, the one as effluent to be purified, the other to form, with the peat, manure, or if there is infectious disease in the house, to be at once removed and burnt. Traps and ventilators would, it is claimed, be unnecessary because the fecal matter never liquefies nor gets into the sewers, and the water in the house drain, and even in the main drain, is never foul. The solid excreta, when it has passed by another channel to its proper receptacle, which is movable, is covered over by a shower of earth or peat as in the earth-closet system. A compost is thus formed of the peat and solid excreta valuable as manure, while nothing goes to the sewer except water. The objection to the system is the initial cost of fitting every house and every closet and sink with the automatic apparatus, but no cost would be incurred in subsequently carrying the contents of the sewers out to sea or in separation and disinfection at the outfall or in irrigation works. An estimate is given of the cost for a town of 10,000 houses requiring three sets of apparatus per house, which would cost 147,000*l.* annually to maintain, including 10,000*l.* for expenses of administration, the compost sold as manure being credited with an annual revenue of 200,000*l.*, showing a profit much more than sufficient to pay the interest upon the first cost of the separating apparatus. According to certificates of Russian experts the system has been successfully used since 1888 at Petrowsky barracks, and in some private houses in St. Petersburg; we accordingly give the particulars, but we regard the idea as perfectly chimerical for general use.

SECTION IX. (Hygiene of Public Buildings), and SECTION X. (Hygiene of Dwellings), were worked throughout as one section. One of the most important papers was by Professor Corfield on "The Protection of Residences against Sewer-air," of which the following is a summary:—

"1. Sewer-air to include the air of private house sewers, commonly called house-drains, as well as of the public street sewers.

2. The formation of sewer-air should be prevented by providing against the accumulation of foul matters in the sewers and their consequent decomposition.

3. To this end sewers should be made of oval or circular section so as to have no angles, and with smooth internal surfaces and to have a sufficient fall. They should also be made as small as possible, so that the water passing down them may flush them, and prevent air accumulation of deposit.

4. They should be well flushed by the water which passes down them, supplemented where necessary by the discharge from automatic flush-tanks.

5. They should be freely ventilated by means of frequent openings at the level of the streets so as to prevent the accumulation of foul air in them. Where such openings become a nuisance from the escape of large quantities of foul air, which is often the case in the upper part of sewers of steep gradients even though they be well flushed, pipes carried up above the houses should be substituted for the ventilators at the street level. Trays of charcoal fixed underneath the ventilating openings soon become useless as the charcoal gets damp and blocks the passage of the air.

6. Even with all precautions for the proper ventilation of the street sewers and the dilution of the air in them with fresh air the escape of air from the sewers into the houses must be prevented as it causes sore throats and diarrhoea and in certain instances specific diseases. Sewer air said by some to be innocuous. The experienced Medical Officer of Health knows better than this. One example sufficient. Deaths at an Infants Home from choleraic diarrhoea produced by escape of foul sewer air, owing to an improperly fixed disconnecting trap.

7. Methods adopted to prevent entrance of sewer air into houses. Flap-traps, mason's traps, syphon-trap. A water-trap practically a satisfactory preventive of the passage of foul air.

8. House drains (a) must be impervious to water and, practically speaking, to air also; (b) must have a good fall, say 1 in 120; (c) glazed stoneware pipes, coated iron pipes—watertight joints—testing of house drains; (d) free ventilation of house drains





Old Farm-house

Illustration by H. W. S.

—necessity of outlet-pipe recognised first in order to relieve pressure of foul air on the water-traps; (e) necessity of air-inlet now recognised; it should be close to the trap on the house drain, and on the house side of the trap may be in connexion with the manhole for access to the trap; (f) the air inlet only acts as such when the outlet is properly placed; if outlet is sheltered by higher buildings or chimneys, the air inlet will often be converted into an outlet, and foul air will escape from it; if the air inlet is properly placed no valve is required for it; (g) by disconnecting trap is meant water-trap provided with an air inlet.

9. Access of air from house-drains to be prevented by the drain itself being practically air-tight; (a) by the drains being as far as possible outside the house; (b) by the substance of the drains being air-tight; (c) by the disconnection of the waste-pipes and rain-water pipes from the drains, so that air from the latter cannot get into them; (d) sometimes by the disconnection of the soil-pipes also from the drains; but generally these are used as ventilating-pipes to the drains, and are connected directly with them; (e) by the soil-pipes being fixed outside the house and being made air-tight; to this end strong lead pipes with soldered joints are the best; (f) by continuing the soil-pipes up above the ridge of the roof as ventilating-pipes; (g) by fixing anti-syphonage pipes to the arms, connecting the traps of the webs with the soil-pipes, and carrying such anti-syphonage pipes up above the house to end in the ventilator of the soil-pipe above the arm from the highest water-closet; (h) by fixing water-traps under the apparatus of the water-closets, to prevent air from the soil-pipes escaping into the water-closets, and so into the house, the simpler forms of such traps the best, but anti-syphonage pipes to be fixed in all cases to prevent the traps being unseated by syphonage; (i) the waste-pipes of sinks, baths, and lavatory-basins to have ventilated syphon-traps to prevent outer air getting into the house through those foul waste-pipes, the gully receiving the waste-pipes of the scullery sink, to be flushed out by means of an automatic flush-tank so as to remove the grease, sand, &c. which collect in it; (j) the waste-pipes of all cisterns to be disconnected from the drains, soil-pipes, water-closet apparatus, and other waste-pipes, and to be made to discharge in the open air, so as to prevent foul air from the drains, &c., getting up them into the cistern.

Dr. Corfield, by means of diagrams and black-board illustrations, explained the difference between some of the ordinary forms of disconnecting traps and between effective and defective trapping, and pointed out in what respects the various traps were good or bad. According to the experiments of Dr. Frankland, the foul air could not pass through the water unless it was agitated, which in that case would be indicated by bubbles. The best system of drainage would be useless if not everywhere perfectly water-tight, and to test this it was necessary to fill it from end to end with water, to plug the ends and then watch it for half-an-hour; unless the water remained stationary at the same level for that time the system was useless. Professor Corfield then went on to give various details as to ventilating pipes, syphonage, wastes, &c., which our readers can easily imagine for themselves, but which may have been new to some, perhaps to many, of the Continental members.

Mr. Arthur Cates (London) said the warmest

thanks of the section were due to Professor Corfield for the able exposition of the present position and practice of sanitation, which had been built up by the researches of a succession of eminent men, not the least important of whom was Professor Corfield himself. He had shown us how to keep out that most fatal of all enemies, sewer gas. He had shown us how necessary it was that there should be nothing passing through those pipes but fresh air, and how to form our drains and intercepting traps so that there could be no lodgment of foul matter in the interior to generate the fatal gas. In fact, the street and the house drains should be always clear. Excellent schemes of drainage had been spoiled by fractured joints which caused escapes, or defective construction which allowed of the accumulation of foul matter, and therefore it was desirable that the drain should be constructed as perfectly as possible. For many years it had been thought that ventilation of the drain was sufficient, but the professor had clearly shown that it was not enough, but that we must have also a clean flow. He could well recollect the controversy between the advocates of the large drain and those in favour of the small drain. They had now come to the conviction that so long as a drain could always take all the water that could find its way into it, the smaller the drain the better. It might seem to be temerity on his part to impugn the regulations of the London County Council, but he feared that the too stringent regulations drawn up by that body would tend to perpetuate the very evils they were intended to prevent, and that they would produce more evil than good. He was satisfied that within a short period those regulations would have to be remodelled. We could not obtain absolute perfection, and they would have to revise these regulations if they were ever to receive any extended practical application.

Mr. John Slater (London) seconded the vote of thanks, adding a few practical observations. It was exceedingly important that the trap itself should be scoured out, and he had been accustomed to prescribe that they should be laid with good falls. The builder was unfortunately not always at liberty to put in the best size of pipe. He was often compelled to put in a 6-in. pipe where a 4-in. pipe would be sufficient.

Prof. Corfield, in replying to the vote of thanks, confirmed the views expressed by Mr. Slater as to a good scour being necessary. Self-acting valves were often prescribed, but they were an obstruction to the free entrance of air and were always a sign of want of confidence in the effectiveness of any system of drains, in which it might be employed.

At a subsequent stage of the proceedings Dr. Corfield put forward the following series of resolutions, which he urged the section to adopt. They were accepted subject to discussion on a following day. The resolutions were as follows:—

1. That the general health of the population is improved, and the spread of disease prevented in towns and dwellings, by the frequent removal of all foul matters and by copious supply of pure water.

2. That the paving of streets should be smooth, and as far as practicable impervious, to facilitate

cleaning, and also to prevent contamination of the subsoil.

3. That the access of ground-air and moisture to houses should be prevented wherever necessary by means of an impervious basement floor, and a damp-proof course in the walls.

4. That house-drains should be water-tight, and should each be provided with a disconnecting trap to prevent access of foul air from the sewer, and be freely ventilated.

5. That street sewers should be ventilated in such a manner as to prevent foul air from entering the houses and streets, and should be well flushed, so as to prevent the accumulation of foul deposits in them.

6. That the minimum width of streets should be twelve metres between houses, and that the houses should not be higher than the street in which they are, nor built back-to-back.

7. That regulations should be made by the public authorities, with the view of enforcing the practical application of the principles herein laid down.

We will continue our notes of the proceedings next week.

#### OLD FARM-HOUSE NEAR NEW YORK.

THIS is an interesting specimen of the very English kind of country buildings still to be found in the United States, belonging to the early period of colonisation, when English tastes and habits in building were still prevalent. The neighbourhood of Boston is, we believe, the best hunting ground for this kind of work, though this special example is at Eastchester, in New York State. The illustration is from a sketch by Mr. E. Eldon Deane.

#### COMPETITIONS.

LLANDUDNO MUNICIPAL BUILDINGS.—The Llandudno Improvement Commissioners have awarded the first premium in the above competition to Mr. T. B. Silcock, B.Sc., P.S.I., Bath; and the second premium to Mr. John H. Curry, A.R.I.B.A., Sutton, Surrey.

SCHOOLS, WEDNESFIELD.—An adjourned meeting of the Wednesfield School Board was held on the 8th inst. at the office, at Heath Town, to decide the competition for the new school to be erected at Wednesfield. A report was read from Mr. Robson, consulting architect to the Education Department, on his examination of the plans sent in in competition for the school, stating that the plan marked "Creon" was the best, and that marked "Compact" was second. Mr. Pool proposed, and the Rev. C. Pockney seconded, that the plan "Creon" be adopted. On the letters containing the names of the competitors being opened it transpired that the plan "Creon" was by Mr. Thomas H. Fleeming, architect, Wolverhampton; and that "Compact" was sent in by Mr. H. Farmer, architect, Darlaston. It was resolved to appoint Mr. Fleeming, the architect for the superintendence of the erection of the school. The other competitors included Messrs. Stanger, Veall, Lavender, R. Rowe, T. Bate, and J. H. Gibbons.



## THE TRADES' UNION CONGRESS.

At Thursday's meeting of the Trades' Union Congress, which was held at Norwich last week,

Mr. Terence Flynn moved:—"That this Congress is of opinion that it should be made a penal offence for any employer to bring, or cause to be brought, to any locality extra labour, where the already existing supply is sufficient for the needs of the district."

Mr. J. H. Wilson, M.P., seconded. The time was coming when this question would have to be faced. They had had to deal with blacklegs, but he thought the time was coming when they ought to deal with those who imported blacklegs, and who brought men to towns on the pretence that there was a scarcity of labour there. He hoped that the Parliamentary Committee would take the matter up, as it was one of the utmost importance to unskilled labour.

The resolution was carried.

## Labour Commission.

Mr. Henry Broadhurst, M.P., moved:—"That in the opinion of this Congress the supplementary report of a section of the Labour Commission, signed by the president, the Duke of Devonshire, recommending additional legislation to the Trade Union Act of 1871, wherein trade societies may sue and be sued in a court of law for the enforcement of agreements, or for the acts of their individual members, is calculated to impose grave obligations, and to seriously imperil the position of trade unions of this country, and do hereby instruct the Parliamentary Committee to be alert in resisting any legislation of that character, as being utterly injurious to the true interests of trade unionism, and calculated to plunge us into costly and unnecessary litigation." He said a minority report of the Labour Commission, the original of which had been altered, had suggested that the unions should be registered, and entitled to sue all persons for all purposes, and that all persons for all purposes should be able to sue the trade unions. If these proposals had received legislative effect, every trade union would have been subjected to an action at law for any action done or words used by any of its agents or members. His opinion was that if this were to be so, in a very few years there would not be a trade union left in this country. The case of "Russell v. Temperton" showed the danger which they were in even under the present state of the law, but if the Duke of Devonshire's suggestion were acted upon they would be practically annihilated. The minority report, signed by Mr. Mann, Mr. Mawdsley, Mr. Abram, and Mr. Austin had exposed the dangers of the suggestion, which was ultimately simmered down into a milk-and-water suggestion that the unions might enrol themselves if they wished. He thought the thanks of the Congress and the trade unions generally were due to those who, in the minority report, had pointed out the dangers of the suggestion.

Mr. Weighell seconded the resolution, which was carried.

## Sanitary House Accommodation.

Mr. John Ward moved, and Mr. A. Humphreys seconded:—"That in the opinion of this Congress all Bills passing through Parliament giving sanction for public works which require a large influx of labour should contain a clause making it compulsory upon the promoters to provide suitable sanitary house accommodation for the workmen."

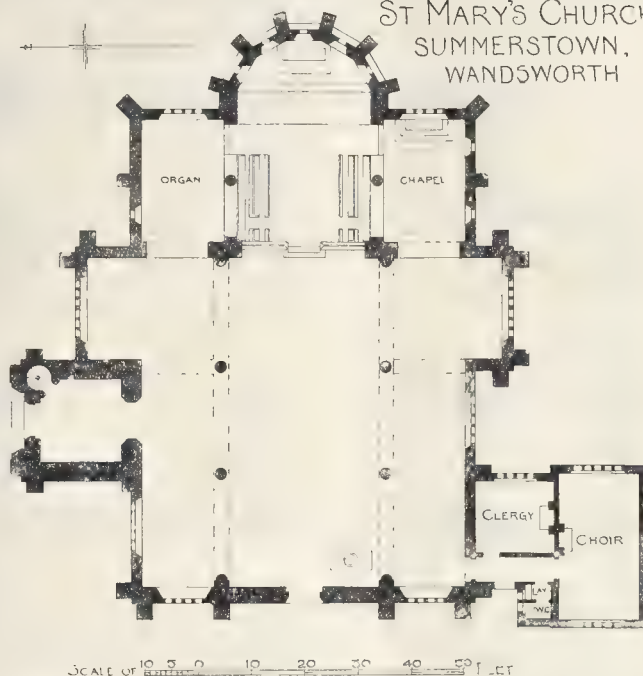
Mr. C. Hurley moved to add the following words:—"And that practical inspectors should be appointed to ensure the same being carried out."

Mr. Galloway seconded, and the resolution, with the addition, was carried.

The Congress was brought to a close on Saturday.

**BIRMINGHAM GENERAL HOSPITAL.**—On the 6th inst. the Duke and Duchess of York laid the foundation stone of the new General Hospital at Birmingham, the architect of which is Mr. William Henman. The total cost of the erection and equipment of the hospital is something like 205,000*l.*, including 50,000*l.* for the site, 5,000*l.* for Messrs. Barnsley & Sons' first contract for preparing the foundations, and 117,888*l.* their second contract for the actual buildings. Full descriptions of the building have appeared in our issues for March 19 and 26, 1892; and on March 26 of that year, and November 18, 1893, for a number of several illustrations of the structure.

**NEW ADDRESS.**—Messrs. Jones & Attwood, of Stourbridge, ask us to mention that they have opened a London office at 110, Cannon-street.

ST MARY'S CHURCH  
SUMMERSTOWN,  
WANDSWORTH

## Illustrations.

ST. MARY'S, SUMMERSTOWN,  
WANDSWORTH.

THIS church is about to be erected in the place of a smaller one built, some fifty years ago, so badly that, after having had the east and south walls underpinned at different times, it finally became so ruinous, owing to the great drought of last summer, that it was condemned by the London County Council and pulled down. The present design is extremely simple in character, and is to cost about 5,000*l.* The plan shows the arrangement of the interior, and chairs will be provided for 500 people. The early character of the chancel is due to the desire of the Vicar, the Rev. J. Y. Morton, to retain portions of the original church, and especially some stained-glass windows erected to the memory of the founders.

The materials used will be red brick and Westmoreland green slates for the external walls and roof.

E. W. MOUNTFORD.

PROPOSED CHURCH OF ST. JOHN,  
WHITTINGTON.

THIS design, though prepared in accordance with a *bona-fide* commission for an intended church, and approved by the committee, has unfortunately not been carried out, owing to a variety of hindrances. The architect informs us therefore, that he can hardly say anything in the way of description of a building which has not been carried out, and which must therefore be regarded simply as a design for a church. The plan is appended (see page 190), and forms a sufficient explanation of the design. Both the views were exhibited in the Royal Academy of this year.

## ST. JOSEPH'S CHURCH, DORKING.

THIS church is being erected to replace the existing temporary Catholic School Chapel. The site was given by the Duke of Norfolk, who also contributed 3,000*l.* towards the cost of the building, his Grace being Lord of the Manor.

The church, which comprises nave, chancel, aisles, tower and baptistery at west-end, stands in a commanding position overlooking the town. The style is a severe form of Early English. Externally the walls are of Bargate stone, with Bath stone dressings, the roof being covered with Broseley tiles. Internally the masonry is of Beer stone, the capitals of the arcade and generally

throughout being moulded, scarcely any carving being employed. The chancel is groined in wood with stone springers, while the nave and aisles have open timber roofs. The tower and one aisle will be temporarily omitted, leaving, however, in the position completed, accommodation for 400 persons. The present contract is for 5,500*l.* The architect is Mr. Fredk. A. Walters, F.S.A., of Westminster, the builders being Messrs. James Longley & Co., of Crawley, Sussex.

## A MOORLAND CHURCH.

THIS little sketch is the outcome of a subject set by Mr. Norman Shaw, R.A., for the Royal Academy Travelling Studentship in 1893.

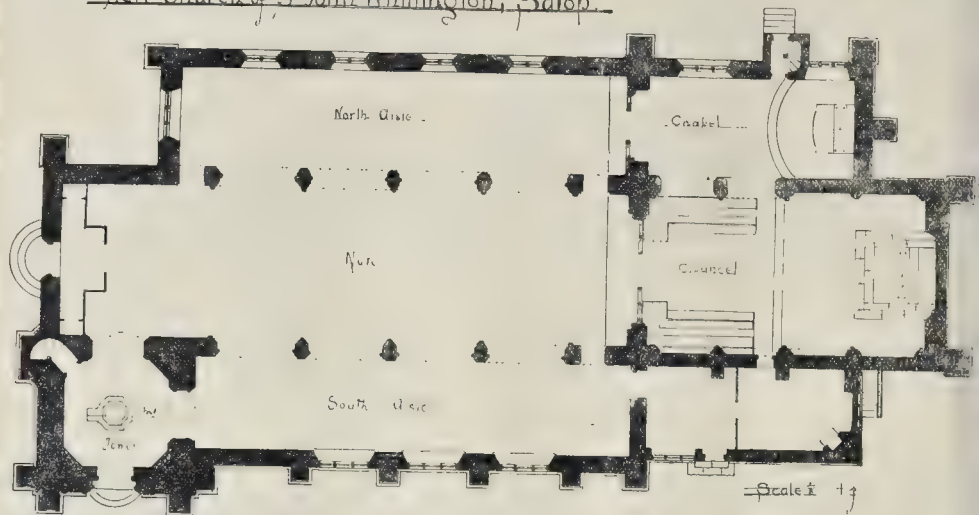
The problem was "a moorland church for 200 people, to have in close proximity, but not touching, a room for Sunday-school, and a shelter for the horses and vehicles of distant parishioners." It seemed to the author that the first principle in a design of this kind would naturally be *simplicity*, and an attempt has been made to carry out this idea throughout the whole design. Effect has been sought after by picturesque grouping and the employment of rough blocks of local stone in uncoursed rubble walling. The tower would be useful as a landmark; it would contain a belfry, and on the floor level would act as a crush space for people leaving the church. The Sunday-school is connected by an arcade of wooden posts and "stone slate" roofing, an entrance for parishioners arriving by carriage being placed on each side. The school-room is treated with solid half-timbering and rough-cast filling, so as to give it a more domestic look, the shelter for horses being formed underneath, the ground sloping sufficiently for the purpose. The conditions of the original competition did not, unfortunately, allow of a perspective being exhibited, although, of course, one had to be prepared, a building of this description depending so much on the effective combination of its various parts.

B. F. FLETCHER.

COMPETITION DESIGN FOR COCKING-  
TON CHURCH, DEVON.

The design was intended to accommodate six hundred, exclusive of choir. The sittings have been somewhat centralised upon the axis of the transepts, this central massing giving, it is believed, a dignity to a plan which is often rendered impossible by adhering rigidly to the Latin cross. The arcade has subordinated itself to the central idea, and yet preserved its essential

*New Church of St John Whittington, Salop.*



character. A strict uniformity of arcade arch has not been observed, the designers demanding rather that the outline shall lend itself to its position.

The materials proposed to be used were local Red Rock for walling, with dressings, piers, and arches, &c., of Douling stone. Roofs to be covered with brindle colour Broseley tiles. A portion of the interior surface of the walls of chancel and baptistry was intended to be plastered for treatment with colour decoration. Elsewhere, the interior was to be faced with the Red Rock.

The roof to be of the ordinary tie-beam character, screened at a slight pitch with a wooden ceiling, panelled and decorated: The wood-work of ceilings and dados to arcade piers, &c., to be of deal, in the latter case stained a dark green, and "dull" polished; the floor of the sacrum within the altar-steps to be of oak and walnut parquet, with steps of solid oak. The floor of the chancel to be of marble mosaic, with steps of polished Devonshire marble.

The design was submitted in competition by Messrs. Tait & Harvey, of Exeter.

### Books.

"Beni Hasan." Part II. By PERCY E. NEWBERRY, with appendix, plans, and measurements of the Tombs by G. WILLOUGHBY FRASER, F.S.A. London: Kegan Paul, Trench, Trubner, & Co., Limited, 1893. Folio, pp. 85, with preface.

**T**HIS is one of the annual volumes issued by the Egypt Exploration Fund, forming part of the Archaeological Survey of the Country, edited by Mr. F. L. Griffith, B.A., F.S.A. It completes the description of the remarkable series of rock-cut tombs at Beni Hasan, some of which are so well known to architectural students from the resemblance of the pillars in front to early Greek Doric columns, although the date of erection is much earlier.

The tombs stand upon the eastern bank of the Nile, the face of the low-lying hills having been cut away for their formation, and being elevated above the level belt of land, which is covered more or less by the rising waters when the river is in flood, they command a view of the Nile for a considerable distance. The entrances are facing the west, so that the last rays of the setting sun must have been full upon them. This peculiarity of position of the entire group is not, however, dwelt upon in the book before us, and we are left without evidence as to whether or not it is merely a matter of chance or otherwise. The better-known tombs have been described in the previous volume, and the series is now completed by a detailed description of the tombs, numbered 15 to 39.

They date from the period of the Middle Kingdom of Egyptian history, from about 2800 to 2500 B.C., and although, as we are told, this was a time of great wealth among the nobles, yet the costly work of the tombs consists in the painted decorations more than in the architectural features. They vary considerably in size and in importance, and a great number were never finished, in fact, one or two show hardly more than the commencement. At a lower level in the side of the hill are a series of sunken shafts, or mummy pits, but in the upper range the pits are covered by excavated chambers. These chambers have in front an open space formed by cutting away the sloping rock until sufficient elevation was reached, which formed the face of the tomb. The entrance doorway in every case occupies a central position in the fronts, and is approached at once from the open space, although in some few instances a portico of two columns has stood in front of it. The chambers, excavated in the solid rock, have mostly a square or quadrangular plan, the sides having been cut with more or less degrees of even finish; the roofs are sometimes arched, and with beams supported by inner columns, in one tomb (No. 13), by four rows of three each. A capital reproduction of a photograph illustrates this tomb, which is one of the most curious of the series. In many cases, nine in the thirty-nine tombs, the entrance into the underworld is represented by the jambs and architrave of a doorway, known as the "false door." In one instance it is painted only, in all the others they are represented in relief or by sculptured lines, so as to keep up the architectural appearance. They do not occur, as might be supposed, opposite the entrance, or with regard to symmetrical arrangement. On the contrary, they are placed mostly to the west. These doorways, as their name implies, are decorations only, and in no case do they form entrances.

In some few of the tombs, there are small inner chambers or shrines, opening from the eastern wall, opposite the entrance. The floors of the chambers are perforated with shafts, the mummy pits, which form the tombs proper, of which there are mostly several in each chamber. One of these, probably, as is stated in an appendix report by Mr. Willoughby Fraser, the deepest shaft that has yet been cleared out in Egypt, descended to the great depth of 105 ft. 3 in.

The doors appear to have been of wood, pivoted above into a wooden lintel, and resting below upon a pivot block of hard material let into a socket. None of the doors remain, but their indications are sufficient to show which were double hung, and which were single doors only.

The architectural features are mainly limited to the columns, although in two of the tombs, described in detail in the previous volume, dentils representing the ends of beams as if of wooden construction are represented. There are in tomb No. 17, still remaining, two beautiful columns out

of six, which formerly appeared to support the roof. These, like the chamber, are rock-hewn, and are formed by tapering shafts, in plan a quatrefoil, which stand on low chamfered circular bases and terminate in bell-shaped capitals of the same plan as the shafts, but with small square abaci. They have been painted over the entire surface with a bright orange ground, on which are three broad bands of green and one of deep red. The caps are lined out with green and white. In other tombs some of the columns are of similar design, very graceful and elegant in their proportions, but far too slender in appearance as supports to the stone roofs. They have fallen for the most part, leaving their caps suspended from the ceilings, as if to show their entire uselessness as a support to the living rock. Elsewhere there are octagonal columns, which are supposed to be the more usual sixteen-sided shafts in an unfinished condition.

The details of the tombs are carefully rendered in every case, there being plans of all, and sections and elevations to a scale larger or smaller as their importance and interest seem to merit.

But while the architectural features of the series are but few their costly nature is indicated by the fact that they were covered with wall-paintings, and inscriptions of great beauty and value to the student of Egyptian history. The tombs, in fact, must have been a blaze of vivid decoration, and much as we may regret the many blanks in the illustrations, showing where the work has perished, yet it must be matter of congratulation to find so much still remains after the vicissitudes of much more than four thousand years.

The paintings consist of architectural decorations, inscriptions, and scenes mostly of everyday life, wrestling, processions, various occupations of husbandry, with some, but not many, temple scenes, offerings to deities, and such like. They are painted on a fine-grained coat of plaster, the pigments, which are mostly mineral, are red, blue, black, yellow, green, and white, laid on probably with a white of egg medium. While the walls are entirely covered with painting, the ceilings are left plain in all except three examples. The walls have a frieze above the figure scenes, which latter occupy the whole of the space above the painted dado which is common to all the examples. While the bulk of the dados are plain, in two instances they are painted pink and then splashed with red, green, and black to resemble rose granite. The doors, jambs, architraves, and columns, are all highly painted, and the imitation of rose granite is not unfrequently found. The scenes are mostly represented by rows of figures arranged horizontally without backgrounds, but frequently figures of large size are introduced. In others, the artists have represented the sandy desert on the top of the pictures while wavy lines below them represent the waters of the Nile. The arrangement of the subjects, the copying of various paintings from one tomb to another and many such

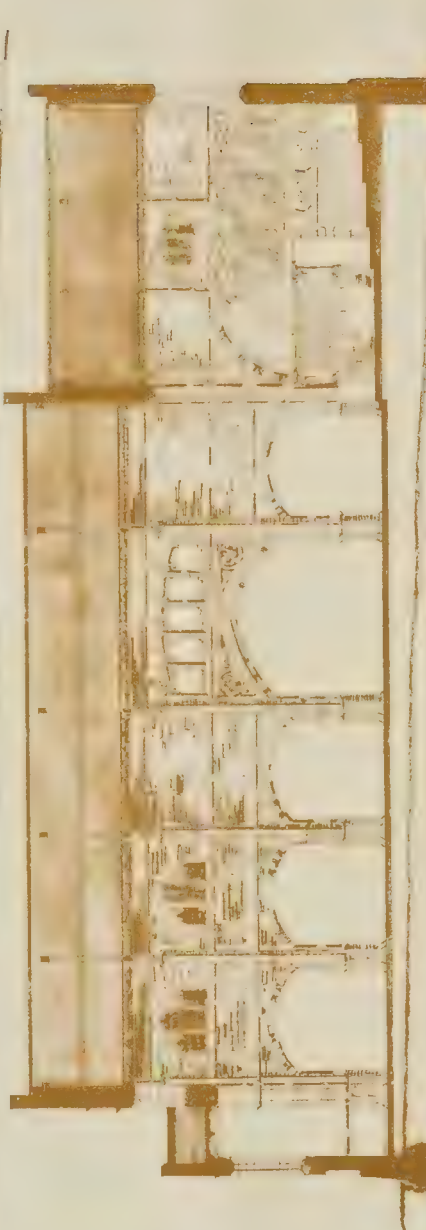




THE BUILDING, SEPTEMBER 15, 1894



South Elevation



Longitudinal Section looking North

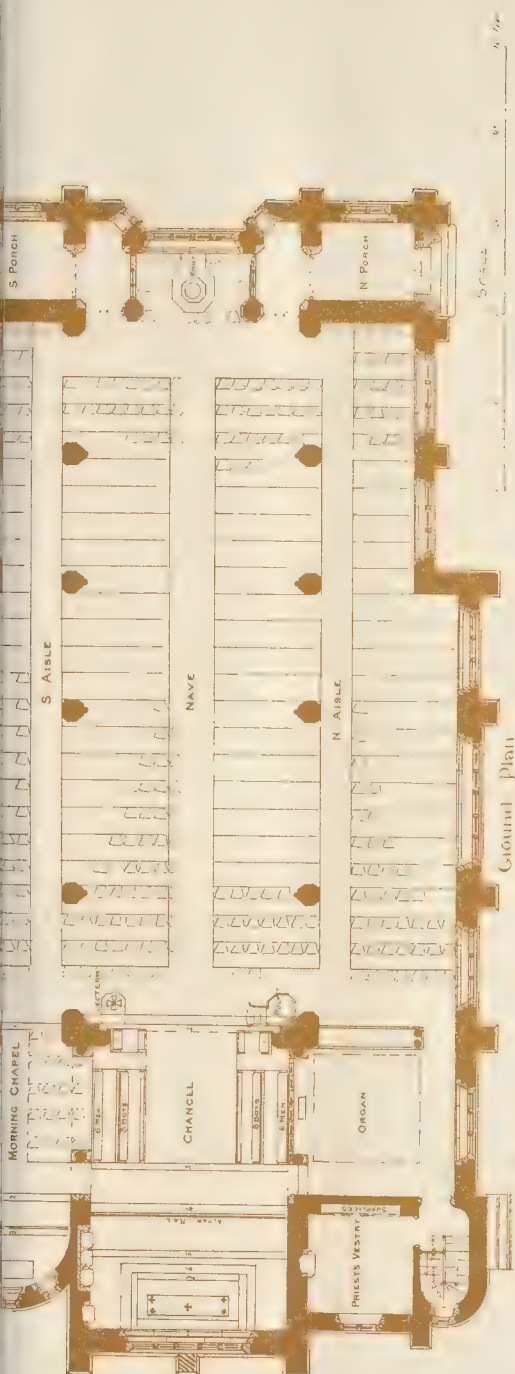
Accommodation

Nave

292

Arch. of the Church of St. John the Baptist, 1894

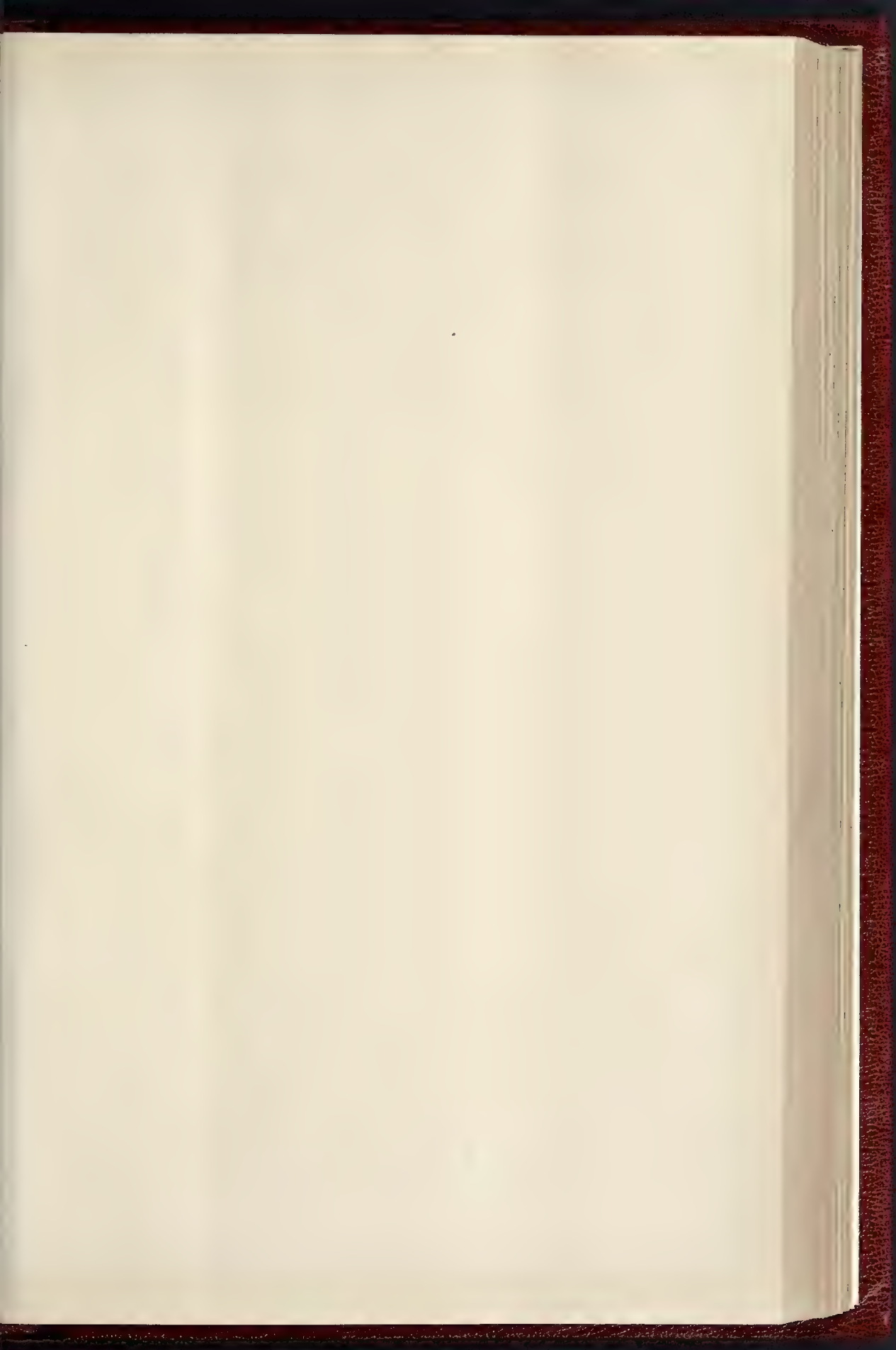




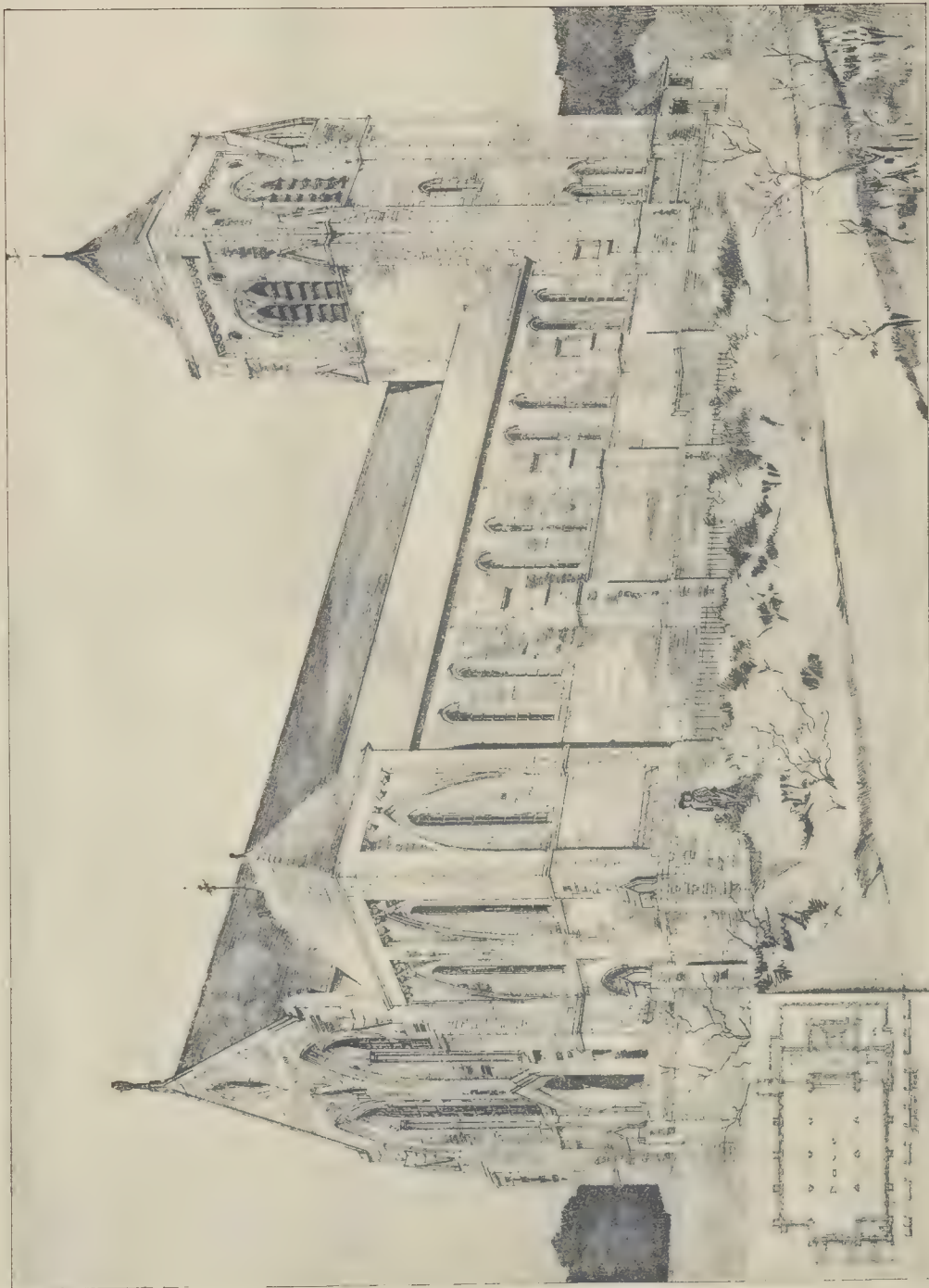
COMPETITION DESIGN FOR COCKINGTON CHURCH, DEVON. F. MESSIS LEO & BARNES







THE BUILDING, SEPTEMBER 15, 1894



NEW CHURCH, FALKLAND GROVE, DORKING.—MR F A WALTERS, F.S.A., ARCHITECT





THE BUILDER, SEPTEMBER 15, 1894.









*Royal Academy Exhibition, 1894*

CHURCH OF ST. MARY, WANDLE





PHOTO SPRAGUE & CO. 48 EAST HANCOCK STREET BETTER LANE E.C.







ST JOHN'S CHURCH, WHITTINGTON, SALOP. INTERIOR VIEW. MR. F. B. WADE, ARCHT. ECCL.



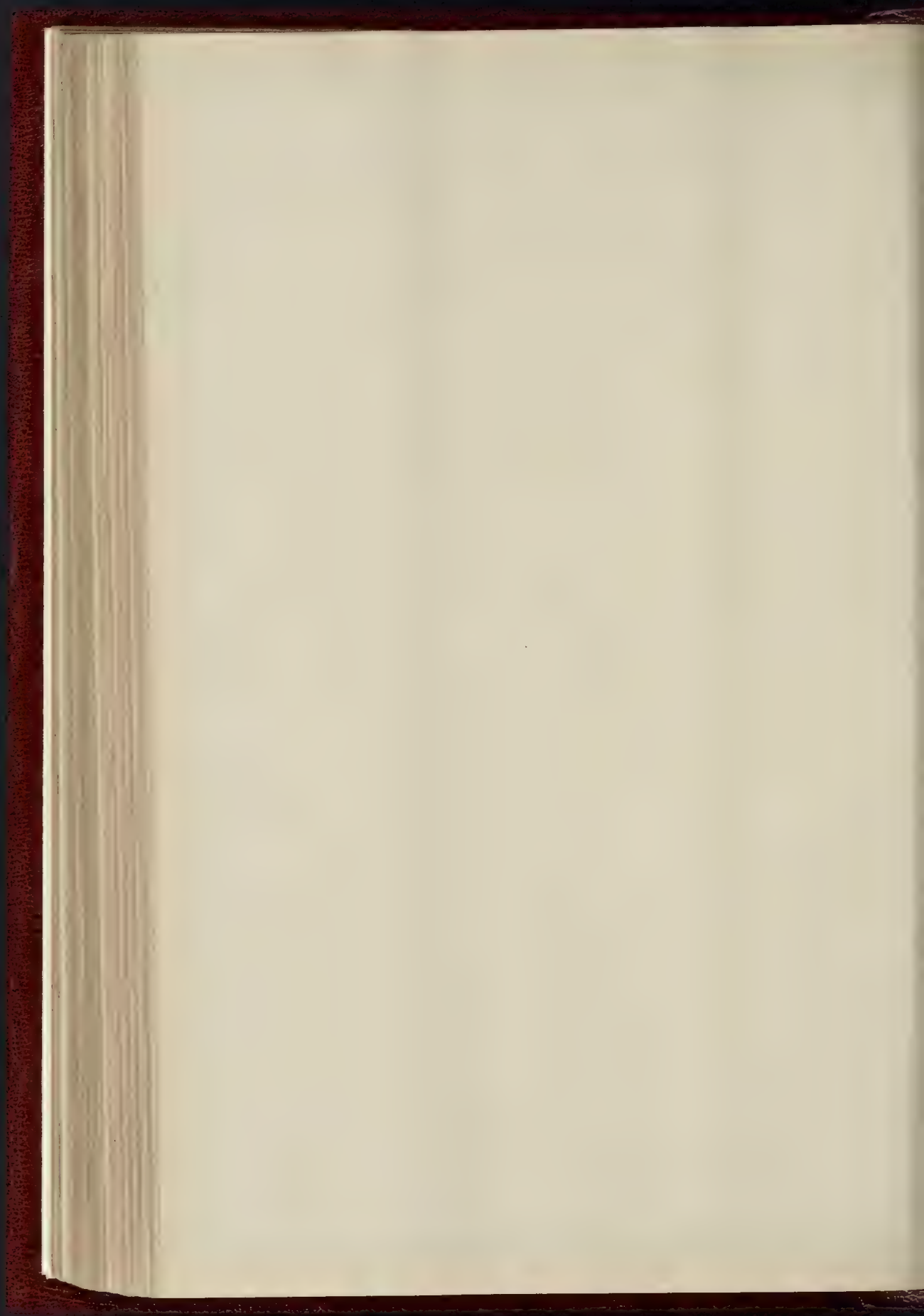




A MOORLAND CHURCH, WITH SUNDAY SCHOOL AND SHED FOR HORSES AND CARRIAGES FOR DISTANT PARISHIONERS

MR. BANISTER F. FLETCHER, ARCHT.

*Reverend Father's Edition, 1894*





matters are noted in the book before us, but into which we have no need to enter.

Not the least valuable portion of the investigation made consist in the reading of the hieroglyphics. From these a series of biographies have been formed of the owners of the tombs. Genealogies, too, have been constructed, and are given. Each owner of the tombs has rendered a record of his life, with references to events, places, his family relations, and with many other details, which now, after so long a lapse of time, may be studied with surprise at the mass of information of the hitherto unknown past, which is now placed within easy reach.

Not only are the inscriptions rendered as they appear on the walls, but they are printed in hieroglyphics and translated. Plate after plate of elaborate detail now preserves for us representations of what has existed on the walls of the tombs during so many past centuries, and the volume before us is not a little interesting as showing the progress of research in recent years, when at last the key has been found to unlock the meaning of the writings on the walls which were regarded with so much surprise a few generations since. The Egypt Exploration Society has rendered good services by the publication of this volume, and to all who are concerned in its production hearty praise should be rendered.

It may be added that the tombs of Beni Hasan, although rifled of their contents at a period many centuries past, present but few evidences of later occupation, certainly of no later interments. One of the tombs appears to have been used as a Coptic school. Others have later inscriptions recording visits of travellers, while others seem to have been occupied by hermits in Christian times. A few articles of interest were discovered during recent investigations, but the painstaking work of clearing the deep shaft already mentioned, which was filled with rubbish, does not appear to have resulted in discoveries sufficient to reward the amount of pains and labour bestowed upon the work. We heartily recommend the work of the Egypt Society, and this book in particular, to all who are interested in the study of the records of the past. It is a new and an important addition to Egyptian history, and it is indicative of other important results to be obtained from the written records on the monuments.

*The Gentleman's Magazine Library: a classified collection of the chief contents of the "Gentleman's Magazine," from 1731 to 1868. Edited by G. LAURENCE GOMME, F.S.A. Ecclesiology: Edited by F. A. MILNE, F.S.A. London: Elliot Stock, 1894.*

THIS is another of the interesting series of reprints from the old numbers of the *Gentleman's Magazine*, at a time when it was apparently the principal organ for the discussion of subjects of interest in connexion with literature and art. We are before referred to a previous volume of these reprints; the present volume, containing reprinted papers on ecclesiological subjects, is of great interest as a record of the opinions and feelings of educated people on the subject a good many years back, and in some cases also as containing information as to the then condition of churches which have since been altered by restoration. The first section of this volume, on "Buildings of the Tenth Century," does not go very far back, as the names of "J. H. Parker" and "Mackenzie E. C. Walcott" appended to some of the communications at once inform us; it is a record of a good deal of controversy as to the real age of buildings which were held by me to be earlier, by others later, than the tenth century; a controversy which has still not quite died out, though there is much clearer light upon it now. Parker, in one of the communications, relates how in 1861 Viollet-le-Duc told him that he would show him, at Rheims, a church of the ninth century—St. Remi to wit; and how, after they had examined it together, a French architect agreed with him that the oldest part of the existing fabric was of the twelfth century, and that the ornamentation had been altered in the twelfth century, and the apse added in the thirteenth. French archaeologists have always had a tendency, however, to exaggerate the antiquity of buildings on their own soil. The section on "Church Interiors" belongs mostly to the same period, though commencing in some notes by "Indagator," under date 1870, on parochial churches, "explaining the details in which (sic) some of the most remarkable particulars yet remaining about our ancient parish churches were employed"; remarks the naïveté which is curious from the present standpoint. The papers of the earlier part of the present

century, mostly about 1840 to 1860, on confessionals, chantries, rood-lofts, &c., contain a good deal of varied information; and a series of papers by "An Architectural Antiquary" on "Sculpture as Accessory to Architecture," dated 1833, and dealing entirely with Medieval sculpture and carving, are well worth reading; one would like to know who the writer was. The remarks on "The Progress of Stained Glass in England" (1817) give an interesting example of the manner in which the subject was regarded by well-educated persons at that date. "The old glass-stainers excelled each other merely in dexterity of placing distinct pieces of a single colour so as to produce the effect of light and shade, but in an imperfect degree, from the harshness of the outline." But the attempt at an exact imitation of painting on canvas, as if the subject were merely transferred from one substance or superficies to another was reserved to the present age," viz., to Reynolds's windows at New College; and the writer goes on to observe how "the late Lord Orford" (Horace Walpole) "withheld his suffrage from the praise which an attempt at once new and successful had universally received from men of taste"; and he quotes T. Warton's poem addressed to Reynolds on the subject. Referring to the Medieval glass, Warton writes:—

"Where superstition with capricious hand  
In many a maze the wretched window plann'd,  
With hues romantic ting'd the gorgeous pane,  
To fill with holy light the wondrous fane."

But contemplating the "Classic merit" of Reynolds's design, he exclaims—

"Thy powerful hand has broke the Gothic chain,  
And brought my bosom back to truth again."

Will the time ever come round, one wonders, when men will think Warton was right and we are wrong?

The section on "Church Bells" gives us, without any satiric intent, some characteristic contrasts in regard to inscriptions on bells; "Soli Deo Gloria, 1664," for instance, may be profitably contrasted with "Cast by John Warner & Sons, London, 1859." This is it to live in an age of progress and business capacity. The section on Church History contains some notices on "Cathedrals Prior to the Civil Wars," from an old MS. of three gentlemen of Norwich, which is really curious and well worth preservation. The notes on the "Documentary History of English Cathedrals" collect together references to, and quotations from, a number of Medieval documents. We should mention also an article dated 1862, by Mr. C. A. Buckley (architect), "Notes on the Churches of the Friars Preachers." We can recommend the publication to all who are interested in church architecture, and in the history of the Medievalist revival and the influences which led up to it.

*The Dwellings of the Poor and Weekly Wage-earners in and around Towns.* By T. LOCKE WORTHINGTON, A.R.I.B.A. With an introduction by G. V. POORE, M.D., F.R.C.P. London: Swan, Sonnenschein & Co. 1893.

DR. POORE'S introduction is little more than a complimentary recommendation of Mr. Worthington's thoughtful little book, the object of which is to consider some points in regard to the dwellings of the poor in large cities; the possibility of having them home-like, sanitary, and remunerative to the landlord. The author lays stress on the advisability of encouraging the dwelling of artisans out of towns, by the further development of cheap trains for working-men, and on the preference for cottage homes rather than "model" houses of the barrack type. In this latter respect he will find much support for his views. All who pay any attention to the subject are beginning to see that capitalists who house people in large concentrated block dwellings, "while perhaps benefiting a small portion of the community, are encouraging the overcrowding on space for which the modern town has an unenviable reputation;" and on another page he recommends, and rightly, that "the maximum number of persons who can be safely and well housed on an acre should be clearly stated by law, and enforced by the local authorities;" or, say rather, the restriction to the limit should be enforced.

In regard to out-of-town dwellings for artisans, however, it is difficult to see how further demands can well be made on the railway companies without in fact calling upon them to take a kind of philanthropic line of action in providing much more cheap travelling than it can at all be in their interests to provide. It may be doubted too, whether it is quite true that "well-designed houses, with good plan and suitable exterior and

interior, often secure a better return than badly-planned dwellings with ugly exteriors." It would no doubt be true if small houses were more plentiful than people to live in them; but as long as there are such a number of people who must have houses of some kind, the cheaply-built ones may command nearly the same rent as the better ones. For the well-to-do artisan a good house can be provided at a remunerative rental which he can afford to pay; the difficulty is rather with the poorest class.

Mr. Worthington devotes a chapter to French cottage homes, and another to French block dwellings, giving several plans, and comparing them with English.

The recommendations as to light, ventilation, and drainage are intended, we presume, for general readers interested in the subject, as a guide to the right course to be taken and the right objects to be kept in view; and are such as are generally agreed upon now among sanitarians, though we do not see why Mr. Worthington recommends that intercepting traps and inspection chambers should be "as near as possible to the sewer."

The important subject of "House Refuse" occupies a chapter, and some details as to the average amount of this per head per annum in towns, and the difficulties of dealing with it, will open the eyes of readers who have no previous information on the subject. A short outline of legislation in regard to old buildings and new buildings occupies two chapters. The general conclusions on the subject are summed up in eighteen paragraphs in the final chapter, embodying conclusions which are fairly deduced from the premises, and to which we recommend the attention of philanthropic capitalists and others who are interested in the subject of the dwellings of the poor.

The value of the book consists in the fact that it gives, within a small compass and in a readable manner, a summary of the present situation in regard to the dwellings of the poor, with a good many suggestions for the future which are worthy of consideration. We must not, however, lose sight of the fact that part of the problem of providing housing for the very poor—the actual existence, in fact, of the very poor—arises in great measure from improvident marriages and other causes for which the poor in a mass are themselves responsible, and that to endeavour to make things abnormally cheap for them in the way of living and travelling is only to approach a form of pauperisation. There is a line to be drawn beyond which we cannot wisely go.

*The Sanitary Arrangement of Dwellings-houses.*

By A. J. WALLIS-TAYLER, Assoc. M. Inst. C.E. London: Crosby Lockwood & Son. 1894.

THIS is described as "a handbook for householders and owners of houses," and is intended, as we learn from the preface, to supply the want of a cheap and not too technical treatise on sanitation for those who wish to have a general understanding of the subject. Our impression is that small and inexpensive books on sanitation are really rather numerous; certainly we have received a good many of late years of various degrees of merit. This one is above the average, and is well illustrated with a number of diagrams of various kinds of drain-pipes, traps, closets, &c.; the illustrations are well selected and the explanations clear. There seems to be a curious slip in the description of the forms of closet-basin illustrated in Figs. 39 and 40, as having the advantage of having "the dead water in the basins unusually deep," whereas the sections show the reverse to be the case; the syphonic closet, Fig. 48, illustrates what may be properly called a deep-water basin, which is one of the best characteristics of this basin, which, in fact, is an admirable one in every way as long as one can always depend on the syphon to act. There is, however, an element of uncertainty about a syphon-closet action, and if it does on any occasion fail to act the result is awkward to deal with.

We can recommend this book for the class of readers for whom it is intended; they will get a good outline of the subject from it, and it is in most respects well up-to-date.

*Practical Building Construction.* A handbook for students preparing for the examinations of the Science and Art Department, &c. By JOHN PARNELL ALLEN, Surveyor. London: Crosby Lockwood & Son. 1893.

THIS is a large book containing a great deal of information accompanied by nearly a thousand



diagrams illustrating points in ordinary construction, and is in the main very well done and very complete. It is intended for the use of students in every trade connected with building construction, and will form a very good primer for obtaining a knowledge of the general processes of building construction; but it must be added that it is rather a statement and illustration of general practice than of principles. For instance, it is stated that fireplace openings "are arched over by a chimney-bar curved to the form required" (it should be rather said they are arched on a chimney-bar); this is the case in many parts of the country, but not universally; and it should have been pointed out that this is a bad principle, as the heavy thrust came on it, and therefore become useless as a tie. This is a small matter in itself, but it indicates that the author has taken what is done as the criterion, rather than what should be done. Under the head of "Damp-Courses" again, we have a number of expedients given, but no very definite guide as to which is the best method; and the same with fireproof floors, &c. The book, in fact, is a kind of elementary dictionary of construction as ordinarily carried out, only not arranged alphabetically; it is however very fully indexed. As such it may be recommended as giving a great amount of elementary information compressed into a volume of no great size or cost, and we have no doubt it will prove very useful to many students as a first book to give them an all-round view of the general processes of construction. The author is Lecturer on Building Construction at the Durham College of Science.

**Building Construction.** Key to Examination of Science and Art Department (Subject III.). By HENRY ADAMS, M.Inst.C.E., &c. London: Chapman & Hall. 1894.

THIS is a small but very useful book, as the manner in which it is laid out encourages the student to think for himself as to the methods and principles of construction, and the reasons for them. It is in question-and-answer form, the method being mainly to ask the student to draw a diagram, for instance, of a roof for a certain span under certain conditions, the correct or best way of doing it being given in a diagram as the "answer"; or in other places to ask the student to correct or fill in a diagram which is purposely incomplete. A student who "means business," and does not allow himself to be tempted to look at the answers till he has thought out the question for himself, may gain a great deal from this small book, and the name of its author is a guarantee as to the accuracy of the "answers."

**A Few Chapters on Workshop Reconstruction and Citizenship.** By C. R. ASHBE, M.A., Architect, King's College, Cambridge. Guild and School of Handicraft, Essex House, Mile End-road. London. 1894.

WE have seen some good work, of a simple kind, turned out from the School of Handicraft which Mr. Ashbee has been instrumental in forming, but we do not think he will improve his position or that of his "Guild" by literary ventures of this kind, consisting of essays in which imaginary puppets under the significant names of "Mr. Pushington," "Mr. Trudge," &c., are made the vehicle of social and artistic satire of that easy school which consists in decrying everything and everybody at present existing, sneering at the Royal Academy and the Institute of Architects, and at nearly all the architecture and art of the day. In a literary sense there is nothing more vulgar than this kind of writing, nor of which the trick is more easily acquired; and if architecture were really in as wretched a state at present as the author would have us believe, it would not be revived or enlightened by a style of criticism which suggests the reflection that the remedy is worse than the disease. The ugly and grotesque scrawl on the cover of the volume, apparently intended for a "landscape with geyser" (as they say "landscape with cattle" in old catalogues) is but a too characteristic symbol of the contents inside the covers.

**REBUILDING OF PREMISES FOR INSTITUTION OF CIVIL ENGINEERS.**—The Institution of Civil Engineers are rebuilding their premises in Great George-street, Westminster, at a cost of about 45,000l. Mr. Chas. Barry, F.S.A. is the architect, and Messrs. Mowlem are the contractors. The whole of the floors are to be fireproof, on the Fawcett system.

## Correspondence.

To the Editor of THE BUILDER.

### PROPOSED CATHOLIC CATHEDRAL AT WESTMINSTER.

SIR,—I scarcely agree with your correspondent "Roman" as to the advisability of an international competition for designs for the proposed new cathedral. Such a competition is apt to call forth too much of the prize medal order of design, whereas the requirements of an edifice, which will be both a cathedral and a collegiate church, are very minute and exacting, and call for a long and careful study of the subject. I believe the work will be safe in the hands of Mr. Bentley, who, I hear, proposes to make a special study of the basilicas of Italy so far as they offer suggestions for his new work. Unfortunately the site is very much enclosed, and will hardly be visible at all from Victoria-street, Westminster. Would it be possible to have a detached tower and baptistry? The former might be made a prominent feature; otherwise, if carried out on strict basilican lines, the building will be invisible from any side until close upon it. BASILICA.

\* \* We certainly think that the matter is quite safe in Mr. Bentley's hands.—ED.

### PICTORIAL ARCHITECTURE.

SIR,—In the issue of *Black and White* for August 25, is published an illustration representing the picture by Mr. Frederick Roe, entitled "The Trial of Joan of Arc."

Inasmuch as the trial took place at Rouen, it becomes a question as to how far the artist was justified in depicting it as being conducted in St. Bartholomew's Church, Smithfield. That this impression is conveyed by the picture in question, will, I venture to think, be apparent to all students of architecture, and to the majority of the intelligent public.

I send by the same post a copy of the publication I refer to, and a view of the church which is reproduced from a photograph.

STUDENT R.I.B.A.

\* \* Whether from St. Bartholomew's or not, the representation is of English architecture, and represents nothing that could have existed at Rouen. It is one more example of the curious indifference of popular illustrators, scene-painters, &c., to architectural truth.—ED.

### LITHOGRAPHIC MATERIALS.

SIR,—Some time ago, a circular was sent to my office by a firm offering to supply small lithographic outfits suitable for use in offices. As I have mislaid their circular, can any of your readers supply me with the address of the firm who sent it out? J. R.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XI.

PLANS, SECTIONS, LEVELLING, NECESSARY DATA.

HAVING investigated the available sources of suitable water in the neighbourhood of the district to be supplied, made careful gaugings, levelled, and obtained all possible information as to permanency of supply, compensation for water-rights, probable demands for easements or purchase of land, and the nature of the ground with regard to excavation for reservoirs, laying mains, &c., it becomes necessary to embody or record the results obtained in the form of Plans, Sections, and Reports.

Water engineers have nowadays much to be thankful for in being able to obtain at a low cost the accurate surveys afforded by the Ordnance Department, instead of having to make special surveys for themselves—always tedious and often unnecessary. The Ordnance Surveys are issued on several scales, and can be obtained from Mr. Edward Stanford, Charing Cross, London, S.W., sole agent for England & Wales. The following information is extracted from a small pamphlet issued gratis by Mr. Stanford:—

1.— $\frac{1}{1600}$  (= $10 \frac{1}{2}$  ft. to a mile) for towns with population over 4,000. Some towns have been published on the scales of  $\frac{1}{3200}$  (= $10 \frac{1}{2}$  ft. to a mile) and  $\frac{1}{6400}$  (= $5 \frac{1}{2}$  ft. to a mile).

Each sheet represents 24 chains by 16 chains.

Price, uncoloured, 2s. each. Coloured, 2s. 6d.

2.— $\frac{1}{3200}$  (= $25 \frac{1}{4}$  inches to a mile). Each sheet represents  $1 \frac{1}{2}$  mile by 1 mile. Price, uncoloured, 2s. 6d. each (with areas printed on, 3s.). Coloured, 2s. 6d. to 23s.

Approximately 1 square inch on these plans equals 1 acre.

The area of each enclosure, together with a reference number, is printed within it on the plan. The brace 5 on the plans indicates that the spaces so braced are included under the same reference number. Areas are computed to the centre of the fence or other boundary of the enclosure, except in the following cases:—

1.—When the fence or other boundary is also the boundary of a parish or other civil division which does not follow the centre of the fence, the area is calculated to the parish or other boundary, and not to the centre.

2.—The fences, &c., bounding either side of a railway are included wholly within its area.

Altitudes are given in feet above the approximate mean water at Liverpool. Those indicated thus— $\Delta$  B.M. 54.7, refer to marks made on buildings, walls, &c., and are called bench-marks. Trinity high-water mark, which is the level of the lower edge of a stone fixed in the face of the river wall on the east side of the Hermitage entrance of the London Docks, is 12.48 feet above Ordnance datum.

3.—Six in. to the mile. Each sheet represents six miles by four miles. For certain counties quarter sheets, which are reductions of the  $\frac{1}{1600}$ th plans, may be obtained; these represent three miles by two miles. Price, full sheets 2s. and 2s. 6d., quarter sheets 1s. each.

4.—One in. to the mile. Each sheet represents eighteen miles by twelve miles. Price (with one or two exceptions) 1s. each.

Before ordering plans an index map of the county, parish, or town in question should be obtained from Mr. Stanford. This will greatly facilitate the purchase, and save much delay and annoyance. It is generally best to have the sheets mounted on brown holland before they are sent. The charge is not heavy and the results are excellent.

The  $\frac{1}{1600}$ th, commonly known as the 25 in. to the mile scale is usually the most suitable for the general plan of a waterworks. Upon this plan the position of reservoirs and pumping-stations, and the lines of mains and branches are marked, the dimensions of the pipes being figured upon them. The positions of sluice-valves, air-valves, hydrants, &c., are also indicated. The names of the owners and occupiers of all lands upon which it is proposed to construct works or lay pipes should be written in the enclosures; and the names of owners and occupiers of mills or other property in connexion with which claims may be made as regards riparian rights, should also be entered against the property in question.

Careful levelings must be made along the proposed lines of pipes, and these should be plotted to the same horizontal scale as the general plan and to a vertical scale of 20 ft. to the inch. Detail plans and sections of reservoirs, pumping-stations, &c., should be drawn to a scale of not less than 8 ft. to an inch.

The hydraulic mean gradients should be drawn upon the sections of the main and branch pipes.

The following example will show the method of calculation by which the losses of head due to friction, and hence the hydraulic mean gradients, are found. Suppose the storage reservoir to be situated at A (Fig. 16) and that 8,640 gals. per day are to be delivered at the point C, 11,520 at the point E, and 14,400 at the point F. The lengths of the main and branches are shown on the section; also the levels at each point.

As the demand during the summer is greater than that in the winter, and the demand during the middle of the day much exceeds that of the remainder, it is usual to take three times the average rate of supply as the basis upon which the diameters of the mains and branches are calculated. Reducing the rate per day to gallons per minute, the system must be so designed as to enable 18, 24, and 30 gals. per minute to be discharged at the points C, E, and F, respectively, with the head available.

Assume a 4-in. pipe from A to B,  
3-in. pipe from B to D,  
2-in. pipe from D to F.

Draw the horizontal line AA' through A, and produce the ordinates through B, D, C, E, F, &c., as to cut AA', at B', D', C', F', E respectively.

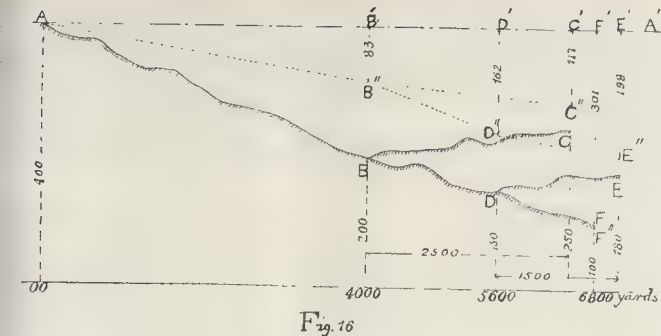
Then by the formula  $G = \sqrt{(3d)^2 \times H}$  (or its

practise by a set of tables), the loss of head due to the discharge of  $18 + 24 + 30 = 72$  gals. per minute through the pipe A B is found to be 83 ft.

Make B'B' = 83 ft. and join AB'. Then AB is the hydraulic mean gradient for the section AB provided that no point in the pipe AB rises above the line AB'.

In the same manner the loss of head due to the discharge of  $24 + 30 = 54$  gals. per minute through the pipe BD is 79 ft. Make D'D' = 83 + 79 =





162 ft. and join B'D', which is the hydraulic mean gradient for the pipe BD.

Again the loss of head due to the discharge of 30 gals. per minute through the pipe DF 139 ft. Make F'F' = 83 + 79 + 139 = 301 and join D'E', which is the hydraulic mean gradient for the pipe DF.

The point F' is therefore only 1 ft. above the hydraulic mean gradient at that point, and this may be neglected as insignificant. It now remains to determine the diameters of the branch-pipes BC and DE.

The head at the point B, or the distance of the hydraulic mean gradient above that point, being 100 - 200 - 83 = 177 ft.; and the point C being 150 - 200 = 50 ft. above the point B; the available head at the point C is 117 - 50 = 67 ft. The diameter of a pipe 2 1/2 ins. in length to discharge 18 gals. per minute with a head of 67 ft. is found from the same equation to be 2 1/4 in.

A 2 1/2-in. pipe (the commercial size next above 2 1/4 in.) would therefore be used for this branch. The loss of head using a 2 1/2-in. pipe, calculated in the same manner as in the previous cases, will be 34 ft. Make C'C' = 83 + 34 = 117 ft., and join B'C', which is the hydraulic mean gradient for the pipe BC.

The head at the point D = 400 - 150 - 83 = 97 ft.; and as the point E is 180 - 150 = 30 ft. above the point D, the available head at the point D = 88 - 30 = 58 ft.

Calculating, as in the last paragraph, the diameter necessary to discharge 24 gals. per minute at the point E = 2 1/2 in. A 2 1/2-in. pipe would therefore be used for this branch also, and the loss of head for such a pipe would be 36 ft. Make E'E' = 162 + 36 = 198 ft., and join D'E', which is the hydraulic mean gradient for the pipe DE.

An examination of the section will now show that the pipes at no point rise above their respective hydraulic mean gradients, and that the latter are not situated unduly above the former.

The velocity of the water in these pipes necessary to obtain the specified discharges must now be calculated.

Let V = velocity in feet per second.  
G = discharge in gallons per minute.  
d = diameter of pipe in inches.

Then  $V = \frac{G}{2d^2}$  (approximately).

From this formula the velocities may be calculated, and are tabulated as follows:—

Section.	Diameter of pipe in in.	Discharge (gals. per min.)	Velocity (ft. per sec.)
A to B	4	72	2
B to D	3	54	2
D to F	2	30	3 1/2
B to C	2 1/2	18	1 1/2
D to E	2 1/2	24	2

These velocities are below 3 ft. per sec. (see p. V.), with the exception of the section D to F.

It will be remembered that the point F was 1 ft. below the hydraulic mean gradient. Taking these circumstances into account, it would be advisable to increase the diameter of the pipe from D to F to 2 3/4 in. This alteration will reduce the velocity in this section to 2 1/2 ft. per second, and will raise the hydraulic mean gradient at F to 2 ft. above it. The system may now be considered satisfactory.

Supposing that at any point the line of pipe did rise above its hydraulic mean gradient, then the pipes preceding that point would have to be enlarged to such an extent as would raise the hydraulic mean gradient above the pipe at that point. As an alternative the line of pipe may be lowered by means of a tunnel or deep cutting, and this is rarely economical or expedient.

In calculating the diameters of the various pipes necessary to afford a stated supply at a given point, the head required at the point to be supplied must be taken into account. Supposing the level of the source of supply to be 500 ft. above a certain village, but that a head of 100 ft. is required at the village itself, to force the water to the top stories of the houses, or for fire-extinguishing purposes, then the available head upon which the diameter of the pipe leading from the source to the village must be based will be only 500 - 100 = 400 ft.

In calculating the diameters of the pipes from the maximum daily rate of supply, a certain minimum must be observed. For instance, a branch may be laid to supply a block of three cottages containing a population of fifteen people. Allowing 10 gals. per day for each person, the average daily rate of flow to afford this supply would be 104 gals. per minute. Trebling this for a maximum daily supply would give 312 (or less than 1 gal. per minute), and the time taken in filling an ordinary 3 gal. bucket would be nearly ten minutes. A system should be arranged so that a discharge at a rate of 3 gals. per minute may be obtained at each connexion. At farm-houses, where the water is used for refrigerating the milk, a supply of at least 3 gals. per minute is required.

On the other hand it is frequently necessary to lay down a branch main of considerably larger diameter than would be necessary to afford the requisite supply. As this often leads to waste of water (especially where the place to be supplied is isolated), which may interfere with the hydraulic mean gradients of the entire system, reduced fittings may be enforced, or the supply may be regulated by a sluice valve under the sole control of the undertakers, fixed at the termination of the branch. The following formulae will enable the engineer to calculate the amount of reduction necessary:—

Let G = discharge in gallons per minute.  
l = length of branch in yards.  
d = diameter of branch in inches.  
d<sub>i</sub> = internal diameter of tap in inches.  
h = total head in feet.  
h<sub>1</sub> = head consumed by friction in branch.  
h<sub>2</sub> = head consumed by a screw down tap fixed at the termination of the branch.  
Then  $h = h_1 + h_2$   
and let  $d_i = r d$

Then assuming that the obstruction to the flow of the water caused by the tap is the same as in the case of short tubes (not less in length than twice the diameter of the orifice), the area at the point of greatest contraction will be "St, the area of the passage through the tap.

Then  $1 - h_1 = \frac{r^4 l}{1.394 d^4 + r^4 l^2} h$   
"  $2 - h_2 = \frac{1.394 d^4}{1.394 d^4 + r^4 l^2} h$   
"  $3 - G = \sqrt{\frac{(3 d)^4 + h}{1.394 d^4 + r^4 l^2}}$

As the calculations from which the diameters of the mains and branches of a water-works are obtained are based upon the results of the preceding levelling operations, a few words upon levelling may not be out of place. In the first instance, the engineer should never neglect to test his level before commencing work. The testing need not extend further than to prove that the level will "reverse" truly, and that the line of sight lies in the plane of collimation.

If, when the instrument has been set up, the bubble does not remain stationary in the middle of the tube on the level being revolved, the error must be rectified half by raising or lowering, as

the case may require, the level by means of the capstan-headed screws, and half by the parallel plate-screws.

If, however, the level, after the most careful adjustment, refuses to reverse correctly, it should be sent to the makers. In the meantime, the bubble should be centred at each reading by means of the plate-screws.

To adjust the level for collimation, select a fairly level piece of ground and measure out three chains, and place pieces of flat stone or slate for the staff to rest upon at the commencement and terminations. Call these A B C D. Set up the level at B and read the staff on A and C. This will give the true difference of level between A and C, as the errors of adjustment would be the same on either side, the distance being equal, and would neutralise each other. Then set up the level at D, and read the staff again on A and C. If, on comparing the last reading with the previous ones, the difference of level between A and C is the same in each case, the level is in adjustment. If, however, the second operation does not agree with the first an error is present. This error is proportional to the length of the sight, and is, therefore (in the second operation), three times as great on A as on C; half the error in level being the error due to one chain in distance. This error must be corrected by raising or lowering, as the case may require, the cross-hair of the level by means of the collimating screws, until the readings of the staff when placed on A and C give the same difference of level whether the instrument is set up at B or D.

Always read each sight twice - the second time after looking. In turning the level on its axis, always turn it the way of the sun, otherwise it may become unscrewed, which would cause error and probably serious delay.

The necessary data include the following:—  
Yield and permanency of source. Quantitative analysis of water. Sanitary survey of source. Lengths of mains and branches. Population to be supplied. Rate of supply per head. Levels. Cross sections and particulars of streams, &c., to be crossed. Additional supplies for trade, dairy, or compensation purposes. Names of owners and occupiers and rateable value of land to be interfered with. Nature of ground to be excavated. Quality of local building materials and labour. Prices of manual labour and horse-hire. Facilities for transit. Particulars as to quantities of water used for mills, &c., in connexion with which claims may be made.

## GENERAL BUILDING NEWS.

GYMNASIUM, RYDAL MOUNT SCHOOL, COLWYN BAY.—The new gymnasium, Rydal Mount School, Colwyn Bay, for Mr. T. G. Osborn, M.A., J.P., is being erected from the designs and under the superintendence of Mr. T. E. Liddard James, architect to the school, London, the builder being Mr. J. B. Jones, of Colwyn Bay.

THE BUILDING TRADE IN ABERDEEN.—In consequence of the financial disturbances in Australia and America, and the resulting desire to find safer investments at home, the selling price of buildings in Aberdeen advanced considerably last spring, while feu-duties and ground-rents were pretty freely bought at thirty years' purchase. This gave an impetus to fresh building, and during this year, so far as it has gone, the Town Council has had more plans submitted for sanction than ever before in the history of the city in the course of a like period of time. From the January to the August meeting that body approved of the plans of 174 dwelling-houses, 4 blocks of shops and dwelling-houses, 20 workshops, 6 cottages, 13 public buildings (including rebuildings and additions), 2 hotels, 33 miscellaneous buildings (including sheds, offices, stables, and small warehouses), and 34 alterations and additions to various premises. The plans of 20 dwelling-houses in one street were disapproved of until the width of the back lanes be made satisfactory. The majority of the buildings described as "dwelling-houses" will accommodate six families, and the "cottages" two families. Many large contracts are still unfinished. The activity alluded to, as was expected, to the success of the men in the joiners' strike at the commencement of the year on the subject of by-laws and against a threatened reduction of pay, and the standard wages remain at 7 1/2d. an hour. This is also the figure for masons. Employers advertising for both builders and hewers find difficulty in getting them, and some of the former class of workmen receive 8d., or even 9d., an hour. Taking advantage of the "boom" the granite quarry-owners in the neighbourhood advanced the price of stones. Between the rise in the value of materials and labour, the cost of building has increased at least twenty per cent. on an average, compared to that ruling four years ago. Finding this on opening estimates, numbers of gentlemen who contemplated building residences for themselves have abandoned



their intention meantime, and it is understood that speculative builders erecting large dwelling-houses in "lands," recoup themselves to a considerable extent by the profit made on sales, when they split up the areas taken out by them into individual subdivisions at a lower ground-annuity than the rate of feu-duty paid by themselves. The number of plans lodged with the Town Council is therefore not an absolutely exact criterion as to the amount of building likely to go on in the city; while the doubling of the line to Culter, about seven and a-half miles distant on the Deeside railway, and the establishment of a suburban train-service on the branch, is leading to a good deal of house-building in that beautiful district, where granite stone, of a good colour, can be got comparatively cheap. The monumental and ornamental granite trade is still handicapped, contrasted with what was the case before the McKinley Act, and the recent Tariff reform, though it has put matters on a better footing for the granite merchants in Aberdeen, will not produce its full effect till business generally improves in the United States.

**WORKHOUSE, PATRICKCOTT, LANCA-SHIRE.**—On the 5th inst. Mr. J. Bingham, chairman of the Barton Board of Guardians, opened the new workhouse at Patrickcote. The total cost of the buildings, exclusive of the land and properties, is 20,000*l.* The site, including that of the old workhouse, covers an area of over six acres. The new workhouse when completed will afford accommodation for about 500 inmates. It has been found desirable to erect the new premises in sections, and those already completed comprise the administrative block, the wards for the aged, infirm, and able-bodied inmates, and the tramp wards. The old workhouse is to be transformed into a temporary hospital. Messrs. Mangnall & Littlewoods are the architects.

**MERCERS' SCHOOLS, BARNARD'S INN, HOLBORN.**—The Mercers' Company in 1892 purchased the site of Barnard's Inn, Holborn, an area of 27,000*sq.* superficial, including the buildings standing thereon, for the purpose of erecting a new school, among the buildings was the Old Inn Hall, which the company decided to retain and make it part and parcel of the new school premises. The new school is faced with red bricks, with Ancaster stone dressings. There are two entrances to the main block of buildings, and one of these is surmounted by a clock tower. The Old Inn Hall has been retained and redecorated to be now used by the boys as a dining-room, and with this object kitchens, sculleries, &c., have been built in close proximity. The head master's room is adjacent to the dining hall, and then the main block of buildings follow—with its large assembly hall on the ground floor, a room 70*ft.* by 40*ft.*, with an arcade on its western side. On the same floor a large lecture room is provided, and also the physical laboratory and science master's room, and a special class-room for the head master. On the first floor are six large class-rooms, and the second floor has a similar number. These rooms are lighted from the left-hand side, with glass screens to the corridors. They are fitted with open warm air stoves, and the larger rooms and all the staircases and corridors are heated with low pressure hot-water, which is also used for extract purposes in a large trunk placed on the roof. Under the lecture-room block a covered playground has been provided for the boys use in bad weather. A separate building of three floors is placed backing into Peter-lane, contains the chemical laboratory and the drawing school. The whole of the buildings are fireproof throughout, and they have been fitted both with fire hydrants and with the electric light, no gas mains being introduced into the premises. The total accommodation is for 300 boys, exclusive of the lecture-room, laboratory, and drawing-school. The class-rooms are being fitted with single desks, and a separate locker is provided for every boy's hat and coat. The whole of the lavatories are situated in a distinct building in the playground. The builders who have carried out the works are Messrs. E. Lawrence & Sons, of Wharf-road, City-road, from designs prepared by Mr. T. Chastfield Clarke, under whose personal direction and that of his son and partner, Mr. Howard C. Clarke, the buildings have been erected. Mr. J. P. King has acted as clerk of the works. Fittings and furniture were supplied by Messrs. G. M. Hammer & Co.

**SCHOOLS, DERBY.**—The new schools which have been erected in Devonshire-street, in connexion with St. Peter's Church, Derby, were opened on the 5th inst. by the Archbishop of Derby. The contract for the work was placed in the hands of Messrs. Walker and Slater, and the plans, &c., were prepared by Mr. Lloyd, of Birmingham. The building is of best pressed bricks, but to about the height of four feet from the ground the walls are faced with glazed bricks, both inside and outside. On the ground floor is a large school-room, which can be divided by means of a roller partition. Adjoining the infants' room are lavatories, a cloak-room, and an apartment for cooking, &c., with a pantry. Underneath these rooms are cellars containing hot water apparatus for heating purposes. The stairs leading to the upper school-rooms are fitted with Hawke's patent tread. Upstairs, one large school-room is 54*ft.* long, 20*ft.* wide. It contains eleven windows. A second room is 36*ft.* long by 22*ft.* wide, and a third apartment 30*ft.* long by 21*ft.* wide.

**CHANCEL, ALL SAINTS' CHURCH, NEWTOWN LINFORD, LEICESTERSHIRE.**—At All Saints' Church, Newtown Linford, an old gallery has been taken away and a new chancel and north aisle built at a cost of a little over 600*l.* The architects are Messrs. Roberts and Simpson (Leicester), and the contractor, Mr. Mason (Kirby).

**HOSPITAL, BIRKENHEAD.**—The new hospital which is being erected by the Birkenhead Corporation, from the plans and under the superintendence of the Borough Engineer, Mr. C. Brownridge, is now nearing completion. It is being warmed and ventilated by means of Shorland's patent Manchester stoves, with descending smoke flues.

**NEW POST OFFICE, LIVERPOOL.**—On the 10th inst. the Duke and Duchess of York laid the foundation-stone of the new Liverpool Post Office. To Victoria-street the facade will be 280*ft.*, to Sir Thomas-street and Stanley-street over 300*ft.* in each instance. The material of which the building will be constructed will be Portland stone. The style of the French Renaissance. The front to Victoria-street, says the *Liverpool Post*, will be adorned by sixteen sculptured figures. Two of these, in a sitting posture, will be placed immediately over the main entrance. On either side of this will be four pillars of Shap granite 18*ft.* high. The height of the doorway will be 14*ft.* As the entrances there are six. Passing to the interior, the public entrance gives access to a vestibule 20*ft.* by 16*ft.* From this, turning to the right and left, the public office is reached, an apartment 72*ft.* by 67*ft.* Like the vestibule it will be lined with polished pillars and panels of Hoptonwood stone. Behind the public office, and lighted from the interior courtyard, will be the office for the transaction of registered letter business, and to the right, from Victoria-street, a telephone-room. The remainder of the ground floor will practically be occupied by the parcels and sorting offices. The parcels office, facing Stanley-street, is designed to be 222*ft.* long by 70*ft.* wide; with a large alcove passing north to the rear of the building. The sorting office is even larger, occupying the ground floor area fronting Sir Thomas-street. A feature of both these offices will be the pillars supporting the subdivisions on the floors above. The main support of the roofs and of the floors throughout will consist of steel girders; in the basement every provision has been made for convenience. The messenger entrance gives access to a staircase which descends to an office (at the corner of Victoria-street and Stanley-street) for the delivery of telegrams. At the rear of the buildings are placed the boiler-house and engine-room, for the electric light (which will be used throughout), the hydraulic lifts, and the heating appliances. Stores and kitchens are also provided for. The general lavatories and conveniences are in the base of the interior court, and are ventilated up to the roof by Kershaw & Lancaster's patent extract ventilators. The same ventilating system will be applied to the entire building. Lighted from the court, are on six sides two storey rooms. On the first floor is a corridor, 280*ft.* in length running parallel with Victoria-street, and having at either end a staircase leading to entrances in Stanley-street and Sir Thomas-street respectively. From this corridor, the windows of which look into the inner court, open the principal departmental offices. At the west end of the Victoria-street side of which are situated the offices of the postmaster, attainable also from Victoria-street by a private entrance and stair. This stairway will be panelled with Hoptonwood marble. Other offices on this floor are the public inquiry office, the correspondence office, and the offices of the district surveyors. At the Sir Thomas-street end is the returned letter department; next to it, with frontage to Sir Thomas-street, the postal stores, and next a room of 108*ft.* by 6*ft.* for postmen. Opening from the latter are the postmen's kitchen and access to lavatories, placed at the back of the building. From the hall, down the Stanley-street side, are rooms for superintendents, examination of candidates, medical officer, engineers' offices, and board of works offices. The staircases at the ends of the corridor, as well as a stair from the telegraphist's entrance in Stanley-street, lead to the second floor. This is appropriated exclusively to the telegraphists. In the front of the building overlooking Victoria-street is the instrument room, 280*ft.* by 68*ft.* There are separate dining-rooms for male and female telegraph clerks, a telegraph school, offices for the telegraph superintendents, and a telegraph stores. In addition, cloak-rooms, lavatories, &c., are provided. The walls of the latter will be faced throughout the building with ivory white glazed bricks, made by Dennis, of Runcorn, the lavatory fittings will be by Doulton and Finch, of London. The kitchen and domestic offices for the convenience of the telegraphists are situated on the top floor over the dining-rooms. The larger portion, however, of the top floors will be occupied by the battery-room, which extends the whole length of the principal front, and partly along the Sir Thomas-street frontage also. Workshops for the electricians and other general offices are planned adjoining. The roofing will be of Buttermere and Penrhyn slates. Internally, the woodwork of doors and windows will be of teak. The glazing is to be

executed in the method patented by Messrs. Mellowes, of Sheffield. All the floors will be fireproof, and asphalted by Mr. Roger Lowe, of Farnworth. Up to the present the general contract for the building has not been let, but the removal of buildings on the site, together with the excavating of the foundations, putting in the foundation walls, erection of coal vaults, &c., has been carried out by Messrs. W. Thornton & Sons, of Liverpool. The Board of Works are represented on the spot by Mr. G. H. Wolven, clerk of works.

#### SANITARY AND ENGINEERING NEWS.

**SANITARY IMPROVEMENTS, MALVERN COLLEGE.**—The sanitary improvements which have been recently carried out at Malvern College under the direction of Mr. J. Willcox, C.E., of Birmingham, are now completed, embracing a reorganisation of the whole of the drainage system and sanitary arrangements, at all the College buildings, and each of the masters' houses in the College grounds. The undertaking necessitated the employment for several weeks of some 200 men, including forty plumbers, and was completed without having to close the College. The whole of the plumbing was carried out by Mr. E. France, of Birmingham, the greater portion of the drainage work, and the structural alterations, whilst the structural alterations, new sanitary blocks, and part of the drainage were executed by Mr. T. Broad and Mr. W. Porter, both of Great Malvern. The sanitary specialties, urinals, latrines and lavatory ranges, &c., were by Messrs. Adams & Co., of London, the school lavatories being of white glazed angular backs, and the urinals of white glazed angular backs, with glazed ware tappings and base combined, in one piece, and special corrugated drip-tiles. The flushing grease traps and drain interceptors were supplied by Messrs. Dent & Hellyer, of London, and the pedestal closets used were Twyford's Deluge M. Messrs. W. J. Williams and T. R. Day acted as the sanitary inspectors.

**SEWERAGE DISPOSAL, RIPON.**—On the 7th inst. Mr. Frederick Herbert Tulloch, M.Inst.C.E., as inspector of the Local Government Board, held an inquiry at the Town Hall, Ripon, with respect to an application by the Ripon Corporation for sanction to borrow 19,000*l.* for purposes of sewerage and sewage disposal, and 1,000*l.* for works of street improvement. The Town Clerk (Mr. M. Kirkley) appeared for the Corporation, with Mr. A. E. Preston, of Bradford, the engineer for the works. Mr. T. Kidd, sanitary inspector, Mr. W. Edson, city surveyor, were also present. Mr. A. E. Preston afterwards explained the plans in detail, pointing out the site of the proposed sewage works, about a mile east of Ripon at the confluence of the rivers Ure and Skell. The whole of the intercepting sewers were new, but in the city the new sewer would replace existing ones in most places. The population of Ripon in 1881 was 7,390, and in 1891 7,512. The sewerage works were designed for a population of 10,000. The area of ground for the works was 30 acres, an additional 24 acres being obtained from land, the property of the corporation, beyond the 24 acres referred to by the Town Clerk. Mr. Preston considered that 25 acres would be sufficient to lay out at present in a scheme of intermittent downward filtration. A plan of the beds was presented on which was proposed to deliver the sewage at which was above the high water datum. There were affluents along the bank of the river for the discharge of water. The nature of the subsoil was sandy loam to a depth of 3 to 5*ft.*, with a lower stratum of gravel. No chemicals would be used. In order to meet floods a considerable bank would be placed round the ground. The inspector afterwards visited the site of the proposed sewerage works and the roads to be widened.

**THE THIRLMERE WATER SCHEME.**—At a meeting of the Manchester City Council on the 5th inst. Sir John Harwood announced that the recent heavy rainfall had brought so much water into the lake at Thirlmere, that the 20*ft.* level had been reached. Thirlmere, that the 20*ft.* level had been reached. For this reason the Waterworks Committee had considered whether it would not be advisable to bring the water to Manchester earlier than was anticipated. It was proposed to open the works next month, and to invite the Prince of Wales to perform the opening ceremony at Thirlmere, which is about one hundred miles from Manchester. The Council concurred in the proposal.

**IMPROVEMENTS ON THE BRIGHTON MARINE FRONTAGE.**—At an estimated cost of 47,000*l.* works for the defence and improvement of the Brighton Marine Front are contemplated by the Brighton Town Council. The scheme comprises the erection of groynes and retaining walls at the western extremity of the sea shore; and the extension of the Madeira Terrace and Colonnade as far westward as the Chain Pier. The Borough Engineer and Surveyor is Mr. F. J. C. May.

**SEWERAGE SCHEME, MONMOUTH.**—A special meeting of the Monmouth Town Council was held on Tuesday, when it was decided to engage Mr. Laisley, C.E. Westminster, to carry out the sewerage scheme, up to the delivery at the pumping-station, and Messrs. Bramwell & Harris, London, are engaged to complete the purification scheme, &c., and to prepare specifications for the electric installation.



## FOREIGN AND COLONIAL.

FRANCE.—The jury commissioned to decide the competition for the monument to be erected at Havre to the memory of Admiral Mouchez, has awarded the first premium to M. Ernest Dubois, sculptor.—M. Coulon, who was commissioned to execute, for the Department of Fine Arts, the bust of the late architect M. Bailly, has also been selected to execute the statue of Théodore de Berville intended for the town of Moulins.—The inauguration of the monument to Duban, the eminent architect, executed by M. Guillaume, is to take place at the Ecole des Beaux-Arts on October 5.—A subscription has been opened to erect a monument at Amiens to the late President Carnot, who during eight years exercised in that town the functions of Ingénieur des Ponts et Chaussées.—Some important restoration work has just been completed at the Church of Saint Philippe du Roule. The vault has been decorated with a number of medallions executed by M. Aubun, the mural paintings are by M. Vivier, and the figure subjects for six new windows have been executed by M. Champigneulle from the cartoons of M. Albert Maignan.—The subscription opened in the Department of La Vendée to raise, at Roche-sur-Yon, a monument to Baudry, the painter, has not been very successful, and it is proposed to raise the remainder of the funds required by a new exhibition of the painter's works at Paris, under the management of M. Bouguereau.—A Hôtel de Ville is to be built at Dunkerque, the design to be selected in public competition.—The plan is to be French Renaissance, and it is proposed to spend about 5,000,000 fr. on the building.—M. Marcel Jacques, sculptor, has been commissioned by the Municipality of Cherbourg to execute a monument to F. Millet, the painter, to be erected on the Place de Gréville.—On Sunday the 16th a monument is to be unveiled in the cemetery of Villennesant, the journalist, and founder of the *Rigolo*.—The death is announced of M. Léopold Amédée Hardy, Government Architect and officer of the Legion of Honour. He died at Châtelon-sur-Loing, at the age of sixty-five. M. Hardy was a pupil of Nicolle and a student of the Ecole des Beaux-Arts. He had been Diocesan Architect at Nancy, Albi and Cambrai, and had carried out some important religious edifices, among which may be mentioned the façade of the church at Piesles (Seine-et-Oise), the church at Colmar (Meurthe-et-Moselle), and the church "Du Rosaire" at Lourdes, as well as the approaches to that remarkable building, of which we gave an illustration in the *Builder* of Jan. 14, 1893. M. Hardy was sent to London as architect in connexion with the French section of the exhibition of that year. He became subsequently Directing Architect of the exhibitions of 1867 and 1878 at Paris.

GERMANY.—The Emperor and Empress were present at the unveiling of the Emperor William's monument, which recently took place in Königsberg. The statue of the Emperor is in bronze, by Professor Rauch. Speaking at the subsequent banquet, His Majesty mentioned that during his reign over thirty-five millions of marks had been spent by the Government in the province of East Prussia on railways, dykes, the regulation of the Vistula, canal works, and other beneficial engineering works. The Emperor, it is stated, will be present at the opening for navigation through Berlin of the canalised Spree. By means of the now completed opening of the channel the largest Elbe and Oder boats will be able to pass through the city. The last piece of work yet to be done is the removal of the pillars of the old Kurfürsten Bridge. An artificial ice skating-rink is to be constructed in Berlin on the same system as that adopted in London and Paris. The estimated cost of building and machinery is 15,000.—The works on the new Victoria Park have already cost the municipality about 142,000, of which 10,000, was for purchase of land and rights.—Plans for an overhead electrical metropolitan railway, in opposition to the Siemens scheme, running through the south of the city, is being considered by the municipality. This line would run from the Silesian terminus to the Zoological Garden. It is wondered that no English firm has as yet tried for the job.—Blocks of copper "slack" are being permanently laid down between some of the tram cars. It is estimated that this paying affords a better return than either asphalt or wood.—An International Heraldic Exhibition is to be held in November in the Arts and Crafts Exhibition. Professor Hildenbrandt is receiving the applications for designs.—The public are now admitted to view Professor Encke's sarcophagi of the late Emperor William and his consort at the Charlottenberg Mausoleum. On entering attention is arrested by a colossal angel in white marble, who, with sword and shield, warns off the intruder. The most successful work is undoubtedly that of the Empress, who is naturally depicted in deep sleep. A good comparison between modern realism and the idealism of the first part of this century is afforded by the contrast with Rauch's neighbouring sarcophagus of Queen Louise.

At the Strassburg Architectural and Engineering Congress, Herr von Schraut stated that Alsace has spent 23,000,000 marks on Rhine regulation since 1870.—The bronze groups for the fountains on the Albert Platz at Dresden have recently been unveiled. The sculptor is Robert Diez.—A monument to Basedow is to be erected at Dessau according to the designs of the architect Rathke.

—The King of Saxony has presented the German National Museum at Nuremberg with a large plaster cast of the monument to Frederick the Wise (Electeur of Saxony, 1525), in the Schlosskirche at Wittenberg. The original is the work of Peter Vischer of Nuremberg, bearing the date 1527, and represents the prince life size in his electoral robes. Another cast is destined for Stuttgart, and a third for the Albertinum at Dresden.—The Redeemtorists have purchased a plot of ground near Saargemünd for 3,000, with a view to the erection of a monastery there.—In the course of the construction of a wharf on the Main canal at Hanau the northern end of the Roman Main bridge was laid bare. Most of the coins found date from 8-117 A.D.—By the discovery of a Roman Castellum in the burg of Friedberg, Herr Koller, the District Commissioner for Hesse, has solved one of the most important problems of the *Limes* Investigations, viz., the fortification of the angle running out northwards from the Saalburg and Gross Kottenburg to the neighbourhood of Giessen. Professor Dieffenbach, who died there in 1892, had already shown that Friedberg, from which Roman roads radiate in all directions, had been a Roman settlement, but it remained for Herr Koller to find the first real traces of the Roman fort. These were parts of a Roman gateway, which he assumes to be the "Porta Decumana." He also located the north-eastern corner of the Castellum, and the south-eastern corner, which practically coincided with the present boundaries. Hence the ancient Castellum was practically of the same dimensions as the Burg or 244 by 154 metres.

AUSTRIA.—The monument "In commemoration of the delivery of Vienna from the Turks in 1683," which is to be unveiled next month is now being put up. The monument represents Rüdiger von Starhemberg on horseback surrounded by types of the defenders of Vienna, above whom floats the Goddess of Victory. Around this group are statues of Bishop Kollonik, Burgo-master Liebenberg, and the "Saviours" of Vienna, viz. Sobieski, King of Poland, Max Emanuel, Elector of Bavaria, Johann George III., Elector of Saxony, and Charles VI., Duke of Lorraine. The architectural parts of the monument, which is the work of Professor Hellmer, are in red marble; the figures are in white Carrara marble.

RUSSIA.—According to the *Novosti* more of Prince Wittenstein's estates in Russia have been sold recently among them Smolovitchi for 1,300,000 roubles. The princess still retains the well-known residence of Werki, near Wilna, Naliboki, and Ljubtcha, the two latter properties have already been bid for on account of Finnish capitalists. Werki, with its magnificent palace and park, occupies the place of a hunting box built in the fourteenth century by the Lithuanian Prince Witen. At the end of that century Prince Jagello, who was also King of Poland, assigned Werki as residence to the Catholic Bishops of Wilna, and it was one of these, Bishop Brzozowski, who built the castle and palace in the seventeenth century. The estate passed from Bishop Massalki to the Princes of Radziwili, and thence to its present proprietress.—SANITATION IN COPENHAGEN.—The Association of Landowners of Copenhagen has presented a scheme to the Corporation, which has been prepared by Herr Winslów and Herr Hausen, engineers, for the solution of the problem of the removal of fecal matter in the Danish capital. The Association maintains that the fecal matter of the city is its property, and that it has, therefore, the first claim to settle this question. Nor will this proposal in any way arrest the introduction of water-closets, so greatly desired by a large portion of the inhabitants. It is proposed that the fecal barrels shall be emptied every week, and that the latter shall be of steel, and air-tight, and be cleansed well after each emptying. The latrine is to be conveyed by special light railways to two stations, one being the existing station on the Lake, and which will receive two-thirds of the production, and one on the Sound, which will take the remainder. An engagement is to be concluded with some contractors for the daily removal of the fecal matter from these stations. Should an epidemic arise it is proposed to transport the entire product to the station on the Sound, where pumping machinery is to be mounted, which will pump the matter through a closed shoot into the deepest waters in the course of ten hours. The same course would be followed in case of any accumulation. The stations would be capable of storing the product of three days, and fitted with complete plant for cleansing and repairing the barrels, thawing the matter in winter &c. The fecal matter would be taken away by agricultural contractors, the farmers, and market gardeners around the town being ready to purchase it, particularly in its raw state, and free from water. The barrels are to be removed at night from dwelling-houses. If steel barrels can be procured the new arrangement would come into

force by November 1, 1895, or some of the present wooden barrels would be made use of for a time. The cost of the entire undertaking is estimated at 48,500, including a sum of 5,500, as compensation to the present "Renovation" Company. This would be an average expenditure of 11s. per barrel a year. This scheme has been approved by 3,500 owners of house property in the city, and it will as doubt be adopted. A company has already been formed for removing the manure from the two stations, with a capital of 150,000 kr.

## MISCELLANEOUS.

GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—The eight honours students in building construction who went to London in June for the practical design part of the Science and Art Department examination have all passed, a bronze medal and first-class certificate having been won by William M'Lauchlan. In the advanced there are 14 first-classes out of 29 passes; while in the elementary 39 students pass in the first-class standard and 10 pass "fair." In the art examination in architectural design all the students presented have passed—two excellent, one first and one second class. In architecture 10 students have passed, 6 obtaining first-class certificates. In the national competition a bronze medal is awarded to Albert H. Hodge for a design for a market and corn exchange. Eight other prizes are awarded for designs and for measured drawings of portions of Glasgow Cathedral. Two students, John Fairweather and James Lochhead, having passed the qualifying examination of the Royal Institute of British Architects, have been elected Associates. Messrs. Thomas S. Fraser and Thomas A. Moodie, distinguished honours students of the college and Queen's prizemen in the advanced stage of the Science and Art Examination in Building Construction, 1892, have been appointed assistants.

"OWEN JONES' PRIZE.—This competition was instituted, in 1878, by the Council of the Society of Arts, as trustees of the sum of 400l., presented to them by the Owen Jones Memorial Committee, being the balance of subscriptions to that fund, upon condition of their expending the interest thereof in prizes to "Students of the School of Art who, in actual competition, produce the best designs for household furniture, carpets, wall-papers and hangings, damask, chintzes, &c., regulated by the principles laid down by Owen Jones." The prizes are awarded on the results of the annual competition of the Science and Art Department. Six prizes were offered for competition in the present year, each prize consisting of a bound copy of Owen Jones' "Principles of Design," and a bronze medal. The following is a list of the successful candidates:—Fred. Appleyard, School of Art, Scarborough, design for wall-paper; Ernest G. Gillick, School of Art, Nottingham, design for lace curtain; Ernest G. Slater, School of Art, Scarborough, design for a damask; Constance T. Smith, School of Art, Glasgow, design for a printed velvet; Edwin Francis, School of Art, Durham, design for a carpet; Samuel Palmer, School of Art, Manchester, design for floor tiles. The next award will be made in 1895, when six prizes will be offered for competition.

PUBLIC WORKS IN CORUNNA AND VIGO.—According to a recent report of the British Consul at Corunna upon the Commerce and Trade of Galicia and Asturias, the project for supplying Corunna with pure drinking water was advanced a stage in 1892, the British Company of Corunna Water-works Company gave the contract for the works to Messrs. Bayliss & Son, a Spanish firm who have been doing business in Spain for some time. Work was not commenced, the engineers of the company having discovered that the plans drawn up by Señor Yañer, the Spanish district engineer, as long ago as 1881, contained a mistake in the levels which would render the delivery of the stipulated quantity of water impossible. A fresh survey made by independent engineers confirmed the view taken by the engineers of the company, and the commencement of operations had to be deferred pending negotiations with the Spanish authorities. The error is not only a cause of great inconvenience to the British company and contractors, but to the inhabitants of Corunna, who continue to incur the risks to health resulting from an imperfect and impure water supply. The harbour works at Vigo progress, and are expected to be shortly completed. The iron pier is finished, and ships load and discharge alongside it. The contract for a railway between the pier and the railway station has been let to the Compañía de Ferrocarriles de Medina del Campo a Zamora, de Orense a Vigo, who have made the requisite deposit, and it is expected will soon begin work.

THE ROMAN WALL.—The examination of Hadrian's Wall, promoted by the Cumberland and Northumberland antiquaries in conjunction with Professor Pelham and Mr. F. Haverfield, was carried on actively in both counties in the first of August, when the Cumberland excavations were suspended. Sections were cut in the vallum at various places, especially at Brunstock, Whitmoor, Lanercost, and Greatcesters, with the result that its general system was laid open, and it was made plain that the mounds of this great earthwork were



16,583, H. Dean and J. Edwards, Drain-channels and



1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26







# The Builder.

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New Conservative Club House, Glasgow.—Mr. R. W. Edis, F.R.I.B.A., Architect.....	Double-Page Photo-Litho.

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### The Housing of the Agricultural Labourer.



THE fifth volume of the report of the Royal Commission on Labour, produced under the supervision of Mr. W. C. Little, the senior Assistant Agricultural Commissioner, sums up, among other things, the result of the enquiries into the condition of rural tenements of the smaller class. For the general purposes of this volume of the Report, a certain number of districts were taken, enclosed within a circumference of about twelve miles diameter each. These were marked and distinguished by numbers in the index map accompanying the Report. Under the general heading "Cottage Accommodation," the subject of dwellings is treated under the four sub-divisions of "Supply," "Situation," "Condition and Construction," and "Ownership and Tenure." The last is a matter of social politics only indirectly connected with our special subject. Under the other three sub-divisions we find information which is of a good deal of interest.

In regard to "supply" (of dwellings), we find that the general tendency of all the reports made by the various Assistant-Commissioners is that cottages are sufficient in number for the present population, but that they are unevenly distributed, scarce in some places, and redundant in others. The fact that, in spite of the steady increase of population in the country as a whole, the supply of labourers' cottages is, on the average, sufficient, although building and re-building have only taken place to a very slight extent, is one of the most practical illustrations we could have of the modern tendency to centralisation of the population in towns. Everywhere in cities comes the complaint of overcrowding, of difficulty in finding dwellings for the poorest class, while in the country the number of dwellings is in any places rather diminished than increased, and "the diminution in the number of cottages has not kept pace with the loss of population." In some parts of the country, however, the case is otherwise; the dwellings are too few. This is the case in the Tisbury district, where, says Mr. Bear, the

Assistant-Commissioner for that district, this is owing mainly to the demolition of old and bad cottages, without a corresponding erection of new ones. One parish is named where five cottages have taken the place of twenty-four.

Throughout the report on cottage accommodation we find a distinction drawn between the condition of things in "close" and "open" villages; i.e., those which are the property of one landowner and those in which there is a multiplicity of rival ownerships. As far as supply of tenements is concerned the "close" villages are the worst off. Assistant-Commissioner Richards observes that where there is one owner upon whom alone rests the obligation to rebuild or repair cottages which have become decayed, and owing to the decreased acreage of arable land the demand for cottages has decreased, "advantage has been taken of every opportunity of getting rid of an investment which often brings more trouble than profit." On the other hand, in "open" villages there is sometimes an apparent abundance of dwellings owing to the existence of a number of life leasehold cottages, which, having no permanent present owner, are allowed to decay, and are in reality no longer fit for habitation, but which produce, on a casual inspection of the district, an appearance of an over-abundance of dwellings which further inquiry proves to be illusory. Generally speaking, however, the Report on this head leaves the impression that the great want in rural districts is not, as a rule, more cottages, but better ones. There are places noted where there is an insufficiency of dwellings, as proved by the admitted fact that when a couple marry they are obliged to live with the parents of one of them till a vacant cottage can be found. But the summary of the whole matter is that "as compared with the past there are everywhere fewer cottages, but in proportion to the population more."

In regard to "situation" the question of proximity to work becomes important, and here the Report sketches a state of things in which dwellings seem to be placed in a most accidental manner, without any regard to the consideration as to where they are most wanted. This is in the main the fault of landowners, who appear to build cottages in any out-of-the-way corner where it is convenient and cheap to do so; where the land, we may suppose, is not wanted for

other and more lucrative purposes. In regard to the Monmouth district, Mr. Richards reports:—

"The cottage question is regarded, and justly so, by the labourers as the burning question of the district. There are not two opinions as regards their situation. Unless by the merest accident, they are very inconveniently situated. They are so scattered, dotted up and down on the hill sides, that it is quite an accident if a labourer has a cottage convenient to his work. The few cottages that may happen to be near a mansion or a large farm are occupied by the personal retainers of the owner or resident, while the labourers have to walk all distances from one to five miles to their work."

In other districts, such as Basingstoke and Thakeham, which are specially mentioned in this respect, it is reported that the cottages are very conveniently placed on or in contiguity to the farms. In some instances, as in the district of North Wiltford, there are historical explanations to be found for the inconvenient position of the cottages. This is a place in the Fen district, and the Assistant-Commissioner, Mr. Chapman, who reports on this district, observes that the villages were originally built on islands in the Fens, which gradually became centres of an increasing population, while on the outlying lands (since reclaimed, we presume) there are thousands of acres unprovided with cottages, the labourers walking out from the villages to their work. Whether the labourers in these districts complain of this state of things we are not told; but in regard to some other districts we do learn that the labourers (and perhaps more often their wives) have acquired such an inherited taste for village life that nothing will induce them to live on the cottages provided for them on outlying farms; that men have been known to refuse cottages on farms, with good gardens and rent free, and prefer to pay 3*l.* or 4*l.* a year for cottages in villages or towns, where they have no gardens, and where they have to walk two or three miles to their work. This is apparently only another phase of that increasing tendency to centralisation which culminates in leading the labourer to desert the land altogether and determine to try his fortune in a city; though Mr. Bear, the Commissioner who reports the facts just named, thinks that it is a great deal from the influence of association and bringing up, and that if cottages for the agricultural labourers had been built on the farms in the first

instance, there would have been no difficulty in filling them. If, however, the labourers are averse to separate cottages when built on the farms and in convenient contiguity to their work, it is easy to understand what a cause of complaint they must find when, as in the case of the Monmouth district before-mentioned, solitariness of situation is combined with distance from their work, and cottages are placed with no consideration at all for convenience of situation. It seems hardly possible that any legal enactment should be applicable to such a difficulty; it would be impossible to define the requirements with any legal precision; it must be left to the influence of public opinion in leading landlords to recognise better the duty laid on them to consider the convenience of their tenants and labourers, in selecting sites for cottages, unless they prefer to wait till the progress of education and combination puts the latter in a position to force more consideration from them. The following summary in the Report of the causes which may have led to the unequal and inconvenient distribution of dwellings is of sufficient interest for quotation:—

"The present distribution of cottages is, no doubt, the result of causes which have been long in operation, though some of them have, no doubt, been less potent of late than they formerly were. Apart from the circumstances which led to the early settlers choosing fertile spots near running water, and clustering their habitations together for mutual protection and safety, the agrarian system of open commonable fields which prevailed over a large part of the country up to the early years of the present century must have been a great barrier to the distribution of cottages. In those parishes where the largest proportion of owners of land was to be found, there was no land outside of the village ring available for cottage sites, all the arable land being held subject to the common right of grazing in the fallow year and at other periods, and the grass was allotted meadow or common pasture, which the owner, as a tenant of the manor, could not inclose. The lord of the manor could, of course, build on his demesne, but he had no particular object in doing this, if the increasing population of the village supplied the labour required by the farmer.

One great cause for the irregular distribution of cottages was the system of parochial responsibility for pauperism, which existed until 1855. Owners of old parishes had up to that time a strong motive for restricting the number of the resident population of those parishes to that of the barest minimum required for the constant service of the farmers, thus avoiding, as much as they could, the burden of pauperism. The restriction in the number of cottages in the close parishes stimulated the building of them in neighbouring parishes in which the labourers had to congregate. The Union Chargeability Act of 1865 removed the great obstacle to cottage building by estate owners, and there can be little doubt as to its having led to a considerable improvement; but the effects of the old system are still observable in many districts."

We now come to the most important point dealt with in the Report, the character and construction of the cottages themselves. In regard to this the Commissioners report that in every district inspected there was found to be a great variety in the cottages, and some of the worst and best might be found in the same district. Here again, however, we meet with the distinction between "close" and "open" villages, but this time the difference is in favour of the close village, the property of one owner. The cottages in this case are generally better built than in the "open" villages, where the property is divided and no one person has a feeling of paramount responsibility with regard to its condition. It is noted also that cottages which form part of the general equipment of a landed estate, provided by the landowner for the accommodation of those working on the land, are generally superior to and kept in better order than those which are built without any connexion with farms, and hired from owners who make money from letting them. This is exactly what we should have expected, and yet these are the class of cottages, as observed above, which the labourer in many places is unwilling to occupy. Clearly the prejudices and fancies of the agricultural labourer are to some extent answerable for the difficulty of housing him properly. The

provision, by the owner of an estate, of dwellings for the labourers on it is one of the most obvious and convenient arrangements possible for the latter, and by keeping the dwellings under the eye of the master and avoiding the waste of time and strength involved in long distances to and from work, it is probably in the end the best course for the owner; but in the first instance it is probably in most cases done at a loss, or at an entirely inadequate return, and the landowner appears to get from the labouring class very small thanks for an outlay which is more obviously and directly in their interests than in his own. And the Commissioners report generally that while improvement has taken place in agricultural dwellings, and is still in progress, this is nearly always on the estates of large landed proprietors; and that elsewhere a large proportion of such dwellings are below the proper standard of decency and comfort, and many of them are in a wretched condition. Those are always the worst which are to be found in "open" villages where men have bought or built houses on speculation, and on waste land where labourers have built houses for themselves. The latter, we are told, are almost invariably the worst of all. So that it would seem that the much-abused capitalist after all does much better for the labourer in the way of house accommodation than the labourer would ever do for himself.

Among the neighbourhoods specially mentioned for praise or blame in regard to their cottage buildings, it is recorded that Norfolk and Suffolk include both the worst and the best examples; the worst, as usual, being the property of small owners, and the best those of the large landed-proprietors. The Southwell Union contains fewer bad cottages than the Commissioner had seen in any other district; the Thakeham Union bears a good character, as well as that of Hollingbourn, in relation to which it is noted that Kent as a whole is very superior to Wiltshire or Dorsetshire in cottage accommodation. The Monmouth Union is one of the worst; in the course of five days driving the Commissioner did not see more than half-a-dozen really good cottages. North Witchford in Cambridgeshire is another district cited as exceedingly bad.

Let us see what is to be said more in detail as to the character and construction of the cottages. In Kent a good many old farmhouses have been turned into cottage dwellings, with excellent results; this, we presume, is in the neighbourhood of places where modern farm buildings and dwellings have been erected. The cottages themselves are constructed either of brick or weather-boarding, with tile roofs (it is not stated on what backing the weather-boarding is placed), or sometimes of lath and plaster; on the chalk hills sometimes of flint. They have generally two rooms downstairs and two upstairs, but the more recent ones have generally three rooms upstairs. These are the Kent cottages, and we cannot think the report satisfactory, considering what a very inadequate material lath and plaster is for winter housing in. Those who have ever slept in an upper lath-and-plaster bedroom in an old farmhouse on a frosty night, and risen to find their sponge and water frozen, and the sensation as of getting up in the open air, will understand what an inadequate kind of defence such walls must be for living within all the winter round; and if, probably, the rural labourer is more hardy in this respect than the habitual dweller in towns, it can hardly be doubted, nevertheless, that this frail kind of housing must have a deleterious effect upon his standard of health and that of his children. The small number of bedrooms is, of course, another very serious drawback, and it is, at all events, well that in the newer cottages the two rooms are being subdivided into three.

The Report classifies cottages into three general heads: (1) Well-built ones of modern construction, and with the requirements of

sanitation properly attended to; (2) Fairly good cottages of old construction, and built without special regard to sanitary conditions; (3) Thoroughly bad ones, out of repair, and deficient in proper accommodation of every kind. The first are, as might be expected, the least numerous, but are steadily increasing in number. The second class are found everywhere, and made of all kinds of material, and are generally, it is said, comfortable enough, and no complaint is made of them, but they are generally small and deficient in number of rooms, and consequently often overcrowded. One Commissioner describes this class of cottage as containing, as a rule, one sitting-room of fair size, about 12 ft. square and 7 ft. high, and two bedrooms, which have not separate access. There is often no fire-place in a bedroom, and the windows are on the floor level, so that no proper ventilation can be obtained. A nearly similar description is given by another Commissioner, with the observation that into one of the bedrooms the staircase often leads. As these are two-storied houses, we must presume that the area of about 12 ft. square, given as the average size of the sitting-room, has to suffice up-stairs for the two bedrooms, minus the piece cut out of one by the staircase. This seems bad enough, but this is the class of cottages spoken of as fairly good—the second class. The best room, it will be observed, is only 7 ft. in height; while most local by-laws have long ago demanded 8 ft. as the minimum of height for the humblest class of living-rooms in town dwellings. A local variation on this widely-spread type is found in the Glendale district (Northumberland), and is thus described by Mr. Wilson Fox, one of the Assistant Commissioners:—

"The houses are generally built on one floor, and go by the name of 'two-end houses.' Although some new ones are now being made with a story above, many 'two-end' ones are still being built, as they usually prefer them, partly perhaps from habit, partly because they dislike the trouble of going up and down stairs, and also because they only necessitate the burning of one fire. A 'two-end' house usually consists of a good-sized kitchen, which is used both as a living-room and a sleeping-room, often about 21 by 16, and one other smaller room, a small pantry or back kitchen, and a loft above the kitchen and communicating with it by a ladder, in which some of the family often sleep."

Though the partially-used sleeping-loft is a drawback, the "two-end house" certainly seems to be a better institution, where there is plenty of ground space to be had, than the previously described two-story cottage, with its only bedrooms probably almost entirely in the slope of the roof, and their windows level with the floor.

A long quotation from the report of Mr. J. C. Thresh on houses in the Chelmsford and Maldon Rural Sanitary districts gives us some further information as to the condition of the dwellings of some of the agricultural labourers. The character of the cottages varies much in the different villages. In some there are but a few of the old lath-and-plaster cottages roofed with thatch, mostly with large gardens. In others houses of the same class are crowded together, so old and dilapidated that they are really unfit for human habitation. They are built with a timber framework, studded outside with laths and daubed over with plaster, or with a mixture of clay and chopped straw. The "walls" are sometimes not an inch in thickness, not even lined with lath and plaster inside; where the laths are decayed the fingers can easily be pushed through, and whenever a piece of plaster falls off outside the interior is exposed. The floors downstairs are usually of brick laid directly on the ground, and reeking with damp. The roof is of thatch, and the bedrooms are almost invariably in the roof; and if there is more than one bedroom, the one is generally entered through the other.

"The windows are small, formed of small panes of glass let into a leaden framework. These windows are usually of the most risky description, and often do not open, but this defect is atoned for by the ease with which the air can obtain access to the room around the side of the defective frame. The utmost



care has to be taken when cleaning them to avoid pushing them out. In fact, in many cases I do not know how the housewife contrives to rub the panes without someone is pushing against them outside, to prevent a catastrophe. Where a back window has been so pushed out the opening is usually found covered over with a piece of matting. The doors are of the rudest description. Probably when originally made there was some pretence to 'fitting,' but this is none now. To keep out the draughts of little or pieces of wood have been nailed along the edges or over the cracks, but the result is rarely satisfactory. The fireplace, and usually there is only one in the whole house, is of the most primitive character. A few iron bars are set in the brickwork, and as if further to prevent any economy in fuel, the bricks at the back crack and crumble and rarely get replaced. The chimney corners are large, and the chimneys wide, admitting sometimes of free ingress for the external air than of egress for the air inside and the smoke from the fire.

Complaints are made of the draughtiness of even the best of these cottages. Often in winter the candle or lamp is said to be blown out, and yet it is impossible to stand upright in the middle. The living-rooms are low, many only from 6 ft. to 6 ft. 6 in. in height, yet the floor space is usually larger than the majority of the more modern cottages.

Very few of these cottages have more than two bedrooms, many of them have only one, and usually, from their being placed in the roof, it is only possible to stand upright in the middle. The living-rooms are low, many only from 6 ft. to 6 ft. 6 in. in height, yet the floor space is usually larger than the majority of the more modern cottages.

When we come to that part of the report in which is condensed into a small space the result of a great quantity of evidence in regard to drainage and water supply, we are confronted with the same class of facts which we have over and over again brought before our readers in connexion with the special reports made to the Local Government Board in regard to the causes of the outbreak of disease in various rural districts in England. Except in some of the larger villages, anything that can rightly be called drainage is unknown. Surface water and house refuse are carried to brooks or cesspools in open gutters. The number of privies is being generally increased, though it is still, apparently, quite common to find only one privy to three or four cottages, "and in many it is a common thing to find a whole row of cottages without any privy accommodation at all." Then (as we all know) one of the great difficulties in the agricultural labourer's life almost everywhere is the absence of good water. "Cottages with thatched roofs depend upon the rainfall" (imagine what a delightful source of "pure water" supply!); and when that is insufficient the occupiers must buy water from their neighbours or drink what they can get from the dykes, brooks, or ponds (which are often the receptacle, directly or indirectly, of the refuse from the houses). Not long since we were in a rural parsonage house in Sussex where the clergyman informed us that he could procure no water for drinking or cooking purposes nearer than a quarter of a mile from his house. This is almost intolerable even to a man who has servants to tend for it; what must it be to the labourer who has no such extra assistance? From omnium also it is reported that in general no provision is made for a water supply. If the cottage happens to be near a spring, well and good. If not, cottagers must go for water. At Ganvay, Tregare, and other villages, the labourers have to go from half three-quarters of a mile for good water, or for any impure water which may be more convenient." Can we wonder at the frequency of those outbreaks of disease which bring down the Local Government Board speedily to make his report, to state the same facts and make over and over again the same recommendations, which it seems to be no one's duty to act upon?

As to the remedies for these evils the report naturally can make only some rather general suggestions. The business of a report of this kind is mainly to get at and classify facts. In regard to the water-supply problem suggestion is made; and it is obvious at such a legislation as is established in London, of condemning a house as insanitary which has not a proper water-

supply, would in the present state of things be often impracticable in the country, as it would be demanding of the property owner what is beyond his powers, and would be met by a *non possumus*. Water-trading companies are not likely to be formed where the prospect of a remunerative return is more than doubtful; and to lay on the Rural Sanitary Authority the duty of providing a water-supply would be imposing on it a very serious burden in cases where no rate that could possibly be recovered could come near to recouping the outlay. Yet surely something ought to be done. The Report suggests Government loans towards the building of better houses where required. Possibly the same method might be applicable to water-supply. In regard to the improvement of dwellings the Report goes to show that this also cannot in most cases be remunerative, and that where large landowners have done much in the way of rebuilding, it has been at a direct loss; considering which, it is highly creditable to such owners that so much has been done, and that their estates are almost invariably the best provided in cottage accommodation. The average rent obtainable from the poorest class of rural cottages seems, from the statistics contained in the Report, to range between 1s. 3d. and 1s. 9d. a week. It is remarked that the necessary accommodation for a full-sized family cottage must comprise three bedrooms, a pantry, a living-room, kitchen, and wash-house, a closet and coal-house. "The average cost of a cottage of this description, properly constructed and fully equipped, cannot be put at less than 125*l.*, exclusive of the value of the site." This seems to us a very low estimate, and it is admitted in the Report that 200*l.* or upwards is frequently spent, on large estates, on a single cottage for which no higher rent than the average named above can be obtained. But even taking the 125*l.*, as possible, no remunerative return can be expected under the present condition of things; and although, as observed in the report, the large landowners may build such cottages from philanthropic motives, the ordinary owner cannot follow their example. The three directions in which the author of the Report suggests the possibility of approaching "a more satisfactory adjustment of outlay and return" are stated as follows:—

"I. To reduce the original cost by the adoption of the best plans for economising space and construction and the use of materials most readily available.

II. By loans at a low rate of interest.

III. By an adjustment of rent in proportion to the character and amount of accommodation afforded."

In regard to the last suggestion it should be mentioned that the Report goes to show that the amount of rent has generally very little relation, beyond certain limits, to the size or capacity of a cottage; a cottage, good or bad, roomy or otherwise, is a cottage, and rent in the same district varies little with the desirability of the dwelling. In regard to the question of cheaper material and construction, Mr. Little mentions his observation of one method of construction which he seems to think worth consideration:—

"I may, in passing, mention that I have recently had the opportunity of seeing some cottages and other buildings erected by Sir Walter Gibbey, Bart., the walls of which were constructed of clay-lump made and dried on the spot. I was shown a wall of this material which had been removed to its present position nearly fifty years ago, and it was still sound. The essential conditions for the use of this material, as for that of the old cob walls in Devon, are that the walls should have 'a good foot and a good head,' a foundation of brick, stone, or concrete, a damp-proof course above the ground-line, and an overhanging eave. One of the great advantages of the use of this clay-lump is that the walls may, at a moderate cost, be made of a considerable thickness, a condition which adds immensely to the comfort of the cottage."

The thickness is an important point, certainly, but it is impossible to regard walls so formed as very satisfactory from a sanitary point of view. What about their condition in a continued spell of rainy weather?

As to number III. of the above-quoted

suggestions, it must not be forgotten that the indifference of the labourer himself is to some extent to blame. As it is truly observed in the Report, the landowner who gives the labourer a cottage, for a rent which does not repay him for the building of it, is really paying him a higher wage than the labourer believes he is receiving. But the labourer does not see it in that way, and, as we have seen, often prefers to pay a high rent for a bad cottage in a village, rather than a low rent for a good cottage on a farm. This fact affords the justification for the sentence with which this section of the Report concludes, to the effect that "no great and lasting improvement will be effected in the housing of the agricultural labourer until his sense of self-respect and his regard for his family impel him to demand better cottages and inspire him to make some sacrifice in order to obtain them." The awakening of the agricultural labourer to this view of the subject would probably prove the most powerful force in effecting a reform that could be brought to bear. But it will probably be another generation before this force comes into extended practical operation. In the meantime, every owner who builds a good cottage where a bad one existed before is helping the good cause, and educating the agricultural labourer to the perception of a healthier standard of living; and as adequate financial return seems out of the question, he must make the most of the proverbial reward of a good conscience.

#### NOTES.



CONSIDERABLE progress has now been made with the construction of the tunnel under the Thames at Blackwall. It will be remembered that at each end of that portion of the tunnel that is under the river, a large circular caisson had to be sunk, the ultimate function of which was to form an air-shaft. Of these, that on the Greenwich side of the river has been sunk to its required depth, and the other is now being sunk, the material from within it (mostly gravel) being excavated by an ordinary mechanical grab or digger, worked by a steam-crane, although provision was made for sinking it by the pneumatic process. In addition to these caissons, there are two others a few hundred yards further in-shore. These will ultimately contain the stairs for the use of pedestrians wishing to use the tunnel, and who are near the banks of the river. Of these two caissons, that on the Greenwich side is sunk to the required depth, but very little has yet been done to the one on the other side. The tunnel is completed between the two caissons on the Greenwich side, and work has now commenced on that portion under the river, the start being made from this side. The shield used in the construction of the tunnel has advanced a short distance beyond the caisson, the rate of progress under the river being at present from 3 to 5 ft. a day. No steps have been at present taken to commence the tunnel proper on the Blackwall side, but the approaches on both sides of the Thames are well advanced. Although a good deal of work has already been done, the really difficult portion of the undertaking—namely, boring under the river, has only just been commenced.

LONDON is again having one of its frequent series of extensive fires. The Bermondsey fire was the most important one last week, as the insurance claims have already exceeded 100,000*l.* This fire afforded us another excellent example of the result of bad construction, and a site which prevented the firemen doing good work. This week the Dalsin timber-yards again gave us an opportunity of fully appreciating the risks attendant on the large storage of highly combustible materials in our very midst. We have referred to this matter before, and mentioned how risks of this



kind are minimised on the Continent. London may not always be so fortunate as to have calm weather with its dangerous conflagrations. A gale of wind will then prove disastrous. As regards the handling of the "C" division of our fire brigade at the Dalston yards, the tactics of their superintendent seem to have been very successful, and his efforts were greatly appreciated.

**C**OMPLAINTS of what has been termed "the impotence of Parliament" are by no means confined to any one party or class. Mr. Emerson Bainbridge, in summing up the lessons of the coal strike last year, complained that our legislators shelved the Arbitration Bill, and busied themselves with measures in which the country appeared to evince but little interest; "whilst millions of troubled people were anxiously looking and longing for some solution of the deadlock which had been pressing heavily on everyone's mind for months." Last week the President of the Associated Chambers of Commerce took up the parable, lamenting the "inability or unwillingness" of Parliament to deal with commercial affairs—instancing the Railway and Canal Traffic Act, which he described as being pushed through rather than passed. At the same time, Sir Albert Rolit could fairly claim to have achieved a certain amount of success, and Sir Courtenay Boyle rightly observed that the passing of this Act marks a decided step in the direction of a settlement of the long controversy between the companies and the commercial community. Sir Albert Rolit is sanguine, and does not despair of the legislative body of which he complains, and to which he belongs. He considers that although the Act only provides that the reasonableness of increased rates may be the subject of appeal, there is every probability of an extension of this principle. But the railway companies will now, perhaps, endeavour to be reasonable without further legislative incentive.

**T**HE use of chilled metallic shot has completely revolutionised the stone-sawing trade, by reason of the rapidity with which the work can now be accomplished as compared with the times when the sawing material consisted only of quartzose sand. It is obvious that in sawing granite, for instance, the sand alluded to, not being harder than quartz, was incapable of doing much work, as that mineral exists so abundantly in granite. What was wanted was something harder than quartz. Several minerals answered the purpose, amongst which were corundum (emery) and the diamond. The former of these is occasionally used for sawing, and largely for rubbing granite, marble, and the like, preparatory to the polishing process; the latter has for some years been employed to a limited extent for sawing the hardest kinds of stone, and diamond discs may be found in the workshops of every lapidary. But these minerals are rather expensive, especially the latter, and until within recent years sharp sand was still almost universally employed. Then a new material, known as chilled shot, was introduced, and was rapidly taken up. During our visits to various granite centres in 1886-87 we found it had already gained a firm foothold, as the rate of sawing was greatly increased by its use; it was also very economical in working, and has been much employed to this day. The foregoing observations were suggested by some samples and a trade description of "Krushite" recently sent to us, which is said to be a new material. It appears to be chilled metallic shot, and is very similar to, though probably not identical in composition with, what we saw in use some eight years since. At any rate, the use of chilled metallic shot for sawing hard stone is by no means a "new" idea either here or in America. "Krushite" is said to be capable of sawing blocks of granite at the rate of 4 in., and hard grit-stone at 9 in., in depth

per hour, with twelve blades in the frame. It is manufactured in several different sizes, the largest (about the size of small rabbit-shot) being suitable for sandstone, and the smallest (fine dust) for the rubbing-bed. The material is used in sand-blast apparatus in lieu of sand, and in substitution for diamonds in boring and drilling. It is described as being absolutely without points or edges, though we do not find this statement borne out by the samples sent. However, there can be no question that the chilled metallic shot is by far the best and most economical material hitherto discovered for sawing the hardest descriptions of stone, and for use in the initial stages of rubbing. It must be handled with great care, though, in the manufacture of marble. Only the other day we saw a beautiful slab utterly ruined, during the final polishing with putty powder, by reason of a few chilled shots having found their way under the felt polisher, with the result that the smooth surface of the stone was deeply scored before the machinery could be stopped. That, of course, is sheer carelessness; the fact that the chilled shot was capable of scratching so deeply in such a short space of time is distinctly in its favour as a sawing material.

**M**UCH attention has recently been given to the testing of hydraulic cements, probably owing to the failures that have occasionally occurred, from not very obvious causes, in large and costly engineering undertakings. No experienced engineer using these materials would omit to have them properly tested and analysed before allowing their use in work for which he was responsible. It is only comparatively lately that it has been recognised that the coarser particles of a hydraulic cement, certainly all that would remain on a sieve having seventy-six meshes per linear inch, and probably many that pass such a sieve, are either wholly inert or so slow in setting as to be useless. The questions of fineness, weight, time of setting, and tensional and compressive strength, are all of the greatest importance, and those who are interested in the subject will find concise information on the latest methods of ascertaining these various qualities in the paper contributed last May, by Mr. W. H. Stanger, M.Inst.C.E., and Mr. Blount, to the London section of the Society of Chemical Industry.

**T**HE London and India Docks Company have lately completed very important alterations to the Poplar entrance of their West India Dock. The old entrance here, which was only 45 ft. wide, has been enlarged to 60 ft., and considerably increased in length. The two pair of wooden gates formerly used have been replaced by three pair of steel gates; these are worked by hydraulic power. At this entrance large pumping engines have been erected, so that the level of the water inside the dock can always be kept 18 in. above Trinity high water mark. The cuttings to the import and export docks have also been increased in width from 45 ft. to 60 ft., but no gates are now used at these places. The railway swing-bridges over these cuts had, of course, to be lengthened. A considerable time ago the London County Council let a contract for the renewal of the road-bridge over the Blackwall entrance, but at present there is practically nothing done towards its erection, and as the entrance is open for shipping, the entire vehicular traffic at this point is altogether stopped, which is a very serious matter. The swing-bridge now in course of construction is a large one, and many months must elapse before the traffic can be resumed.

**A** SHORT paper by Mr. R. R. Tatlock, F.I.C., issued from the Glasgow City Analyst's and Gas Examiner's Laboratory, combats the idea that a large percentage of fuel is lost in the smoke which issues so abundantly from our chimneys, and urges that statements as to the loss of heating power

along with smoke have been greatly exaggerated. In some experiments which were made as to the composition of smoke in special cases, it was found that the smoke represented 51.46 grains of matter per every 100 cubic feet of furnace gases, and of this amount 20.65 grains consisted of incombustible mineral matter. Other experiments on the same lines gave much the same average results. In regard to the conclusions to be drawn from these, Mr. Tatlock says:—"To find how much carbonaceous matter was actually lost as smoke, it will be necessary to know the number of cubic feet of furnace gases given off by the combustion of, say, 1 ton of the dross. If the percentage of carbonic acid in the furnace gases is taken at 5 per cent., the total volume of these given off from 1 ton dross would be about 940,000 cubic feet, measured at the ordinary temperature and pressure, and this would contain 41 lbs. of carbonaceous matter, and 27 lbs. of mineral matter. This would represent 1.33 per cent. of the volatile matters (gas, tar, &c.) given in the analysis of the dross, and if from this is now calculated the heating power according to Playfair's formula, it will only come to 0.057. This figure, compared with the practical heating power (7.75) of the dross, goes to show that the solid combustible matter of the smoke can only account for the very small percentage of 0.74 of the total heating power which can be obtained from the coal. We may add that this result is in accordance with the opinion often expressed, and to which we have always adhered—that for practical purposes there is no such thing as "consuming your own smoke;" at all events, as Mr. Tatlock puts it, "there is little or no gain in burning smoke," and other methods of dealing with it ought to receive consideration.

**A**T Berlin, the pending opening of the New Imperial Houses of Parliament has occasioned some discussion as to the future arrangements of the König's Platz. The main front of the new block faces this historic square, in the centre of which stands the Column of Victory. Directly opposite, however, we unfortunately find a theatre of little architectural pretension, which contrasts oddly with its surroundings. It was for this site that the winners of the great National Monument competition had planned a Pantheon, which would have certainly been a far more imposing memorial to the late Emperor William than the nondescript equestrian statue now being erected in front of the "Schloss." It is, however, not unlikely that the nation, as such, will yet one day carry out this idea by voluntary subscription, if a fitting occasion arise, but until then Herr Wallot, the architect of the Parliament buildings, will probably have to content himself with some judiciously-arranged colonnades. These will enclose the approach to his building, and, as far as we can see from his plan, they should greatly improve its aspect.

**I**N our review (Nov. 3, 1888) of the late William Rendle's book upon the "Inns of Old Southwark and their Associations," illustrated by Mr. Philip Norman, F.S.A., we described the architectural features common to buildings of that class, distinguished by their "galleries" and "boxes"—names, by-the-by, that have survived to the present time in our theatres, reminding us that dramatic performances were formerly held in inn courtyards. Recent changes in the Borough and other quarters of the town have left in London but very few examples with that particular constructive feature, and now one of them is about to disappear. The sale is announced of the "Old Catherine Wheel" in Bishopsgate—street Without, No. 40, which, standing back from the main thoroughfare, has commonly escaped notice: the total freehold area to be devoted to building purposes is about 11,200 ft. superficial. This inn, whose galleries on the



first and second floors had been latterly covered in with latticed windows, was damaged by fire in March, 1886, and is, we believe, the last house of its kind in Bishops-gate-street, which could boast of many a famous galleried inn in times not remote. We well remember, for instance, the "Four Swans," the "Green Dragon," and the "Flower Pot." The "White Hart," originally a hostelry that appertained to Simon Fitzmary's neighbouring priory, afterwards Bethlehem Hospital, was pulled down in 1829; it stood next north of St. Botolph's Church. The date "1480" was on its front, consisting of three bays reaching from the ground to the attic story, with lofty windows all along the first and second floors, somewhat like that of the "Half-Moon," which remained in Aldersgate-street until 1880. Pennant cites the "White Hart," but he says "none of the original building appears to be left." About twenty years ago they pulled down the "Four Swans" (belonging to Magdalen College, Oxford), where Sir Thomas More's retainers lodged when he occupied his mansion close by. On one occasion the landlord resisted a seven hours' siege by Ireton and a party of Roundheads when in pursuit of some messengers from Sir Edward Dering at Sittingbourne to Lord Coring's forces at Ingatstone, Essex. It was also in high favour with members of Cambridge University, and the chief posting-house to and from the eastern counties. Hobson, the Cambridge carrier, however, used to resort to the "Bull" in this same street.

AT the Church Congress to be held at Exeter next month, commencing on the 9th, we see that the subject of church architecture, or we suppose church decoration rather, is to be treated by Mr. W. B. Richmond, from whom the Congress are sure to have a paper worth listening to on the subject. If those who are concerned with the so-called Ecclesiastical Art Exhibition, which forms an annual feature in the Congress, would follow the same example, and go to architects and artists for drawings and designs for exhibition, and for work made from their designs, instead of going to church furniture shops, there would be some chance of the exhibition being worth seeing, which it scarcely ever is.

THE usual autumn sensation play at Drury-lane contains, among other things, it appears, a piece of brief but pithy architectural criticism. Some one refers to the Law Courts as a building which is "a cross between Westminster Abbey and the Underground Railway." Those who have tried to find their way about the interior of the building on business will best appreciate the point of the remark.

#### ARCHITECTURAL ASSOCIATION. SUMMER VISIT TO KETTERING.

ON Saturday last, a party of members of the Architectural Association accepted the invitation of their past president, Mr. J. A. Gotch, and visited Kettering, where they were met by Mr. Gotch, and his partner Mr. Saunders. Piloted by these gentlemen, the party spent the morning in exploring Kettering and visiting several buildings recently erected from the designs of Messrs. Gotch & Saunders. The first halt was made at "Sunnylands," a new house on the outskirts of the town, in which the architects have seized the opportunity afforded by the apparent difficulty of the site being some 3 ft. below the road level to produce some charming effects. A raised terrace with arched balustrade and steps on each side to the garden leads from the roadway to the entrance porch, which projects from the main building, and has over it the landings of the principal stair. The exterior of the house is carried out in red Leicester sand-faced bricks with dressings of Weldon stone, the details being conceived in the spirit of that phase of English Renaissance with which Mr. Gotch's book has made the world familiar. Internally one of the most pleasing effects is that of the entrance hall, with its marble mosaic floor and the oak staircase. Considerable attention has been given by the

architects to the arrangement of bays and alcoves, which add largely to the interest and piquancy of the interior, whilst plate glass and low window sills meet the requirements of modern householders, and at the same time are cleverly managed so as not to become bugbears to the designer. Indeed, one of the most striking characteristics of the domestic work of Messrs. Gotch & Saunders is the happy combination of modern ideas with the full spirit of old work which makes the productions of those gentlemen eminently liveable homes without sacrifice of æsthetic satisfaction.

Returning to the town, the party next made their way to the church, the exterior of which derives its chief interest from the fine western tower and spire. The church is of Late Perpendicular date, with a few earlier windows and doorways, which have probably been reused from a former edifice. The building has been recently restored by Sir Arthur Blomfield, and though large and spacious, contains few features of interest internally. The appearance of external treatment of plinths and buttresses on the eastern face of the tower, though now inside the church, is somewhat puzzling, and is open to various conjectural explanations. Some good carving is to be seen on the roof of the south chancel aisle, generally known as Sawyer's Chapel, and there are some remains of old wall paintings, including a figure of St. Roche and a few fragments of stained glass.

From this old parish church it was fitting that Mr. Gotch should conduct the visitors to his new mission church of St. Mary the Virgin, passing on the way the Sun Hotel, the exterior only of which was glanced at. This is simply and broadly treated, but is, nevertheless, full of piquancy from the curiously irregular line of the street frontage, the road winding with a double curve just at the point where the inn is situated.

The church of St. Mary the Virgin affords accommodation for about 500, the whole of whom are to be seated in the nave, the aisles being narrow and for passage only. A departure from precedent is seen in the treatment of the nave piers, which are of brick and plastered, a band of cast ornament forming the impost. The arches are low and segmental in form, thus leaving plenty of room for ample clearstory windows from which alone the nave is lighted, without any openings in the aisles. The chancel is 40 ft. long, and has its window at a considerable height from the floor, so that the whole church is lighted virtually from the clearstory level. The aisle-walls, following the *notif* of the nave-piers, are plastered, the remaining walls being faced with a warm-coloured iron-stone from Glendon, three miles north of Kettering, with Weldon stone for dressings. These materials are also used throughout for the external wall facings, and form a delightful combination with the Broseley tiles used on the roofs. The vestries have been treated in a somewhat domestic character, and, indeed, a flavour of domesticity runs through many of the details of the building, to the advantage of the homeliness desirable in a church intended primarily for the working population, in whose midst the building is located.

From the church the party returned through the town, halting at the Stamford-road Board Schools, a large and well-planned school for 1,000 children—boys, girls, and infants, on the central-hall system. The class-rooms of the mixed school are divided from the central hall by glazed screens; wood-block floors, and glazed brick dados are used throughout, and a proper cookery class-room is provided on the girls' side. The most prominent feature of the school is the system of ventilation by forced current on what is called the "plenum" method, a fan in the basement driving fresh air through ducts to pass over batteries of hot-water pipes and so into the lower part of the rooms; whilst the foul air makes its exit through open louvred turrets on the roofs. With the idea of obtaining the fresh air as pure as possible the intake is contrived at a high point in the clock-tower which forms the dominant feature of the external composition.

It being now near luncheon-time, the party turned their steps towards the Liberal Club, another of Mr. Gotch's works, rather earlier than those already seen, having been built in 1886, in which skillful treatment has been given by the designer to an irregular and awkward site. A full inspection of the interior of the club, with its reading and smoking rooms, two billiard-rooms, assembly-rooms, dining-rooms, having been made, luncheon was then an agreeable interlude.

After luncheon, carriages were provided by Mr.

Gotch, and the party drove northward from Kettering to Rushton Hall, seeing on their way, but without stopping, the new Wesleyan Chapel, erected from the designs of Messrs. Gotch & Saunders. Rushton Hall is one of those examples of the English Renaissance which the labours of Mr. Gotch have done so much to bring to the appreciation of architects and amateurs. Upon a foundation of fifteenth-century work, the great Northamptonshire building squire, Sir Thomas Tresham, added here much of his work, and after the misfortunes which came upon him by the participation of his son in the Gunpowder Plot, his successors in the property, the Cockaigns, made still further additions, bringing the house to its present form and attractiveness.

Arranged around three sides of a quadrangle with a low screen corridor closing in the fourth side, and with its dormers of varied design, and its slight differences of detail, the house forms one of the most charming instances of Early English Renaissance to be found even in Northamptonshire. After duly admiring the exterior, and viewing the hall and the principal staircase, the only remaining parts of interest internally, the visitors proceeded to the famous triangular lodge, erected at one end of the park by Sir Thomas Tresham, where much time was spent in endeavouring to unravel the marvellously intricate web of symbolism which the designer has thrown over the whole building. Of the main idea, the form of the building and the superscription over the doorway, "Tres regnum ferant," give a sufficiently clear indication, but it is obvious that the imagery does not end with this, and it is not easy to explain even what is evidently here veiled in imagery and illustrated by symbol. The allusion even of the dates on the work is not readily explicable, but apparently those of 1593 and 1595 refer to the commencement and completion of the work. The return from the lodge was made by way of the delightful avenue of chestnuts, in which the poet Dryden is said to have walked and to have composed "The Hind and the Panther." Time did not permit of further explorations of the works of Sir Thomas Tresham, and the party drove back to Kettering, alighting on the West Hill, where Mr. Gotch has built for himself the first house on one of the best locations around Kettering, an example followed by his client, Mr. Thorpe, whose house, Elm Bank, was then inspected. Elm Bank is built on the brow of the West Hill and the sloping nature of the site has led to the adoption of some interesting features in the general disposition of terraces, steps and balustrades, a garden-house, and stables; whilst the house itself is very effective and very good value for the cost, less than 3,000*l*. One of the most pleasant features of the plan is the entrance hall arranged as a wide corridor from which the reception rooms open. Advantage is taken of the roof space to provide not only additional bedrooms but a large play-room which serves not only for the amusement of the children but also for that of their elders, being admirably arranged and suitable for private theatrical performances. As in most of Messrs. Gotch & Saunders' recent work the materials are red Leicester sand-faced bricks and Weldon stone dressings, with Broseley tiles for the roofs. Each of the principal rooms is ventilated by a separate upcast flue, the fresh air being admitted at ceiling level in the bays.

Crossing the road the party entered Mr. Gotch's garden and then the house, which that architect has built for himself, and here they were entertained by Mr. and Mrs. Gotch with tea. Mr. Gotch has selected an admirable position for his own house, the view of Kettering town with the church and its steeple being very charming. The house follows the lines of those previously seen in many respects, but is very quietly treated. Thus ended for the visitors a very enjoyable day, and they returned to town fully persuaded of the delights of a country practice—when it is a good one.

MIDLAND INSTITUTE, BIRMINGHAM.—The Archaeological Section of this Institute made its concluding excursion of the season on Wednesday, the 12th, paying a visit to the neighbourhood of Harecastle and Congleton. They visited the well-known Moreton Old Hall, and from there went on to Astbury Church, which possesses a screen more than 400 years old, a font with a wooden Jacobean cover, and several monuments of great antiquity. On reaching Congleton, the party were met at the Town Hall by the Mayor and the Town Clerk, who allowed them the privilege of inspecting the valuable collection of ancient deeds, charters, and muniments belonging to the town, a description of which was given by the Town Clerk.



*A Villa near Christiania.—Design selected in Competition.*

REFERENCES

1. Hall.
2. Drawing-room.
3. Ante-chamber.
4. Glass covered Verandah.

5. Dining-room.
6. Service.
- 7 and 8. Servants.
9. Lavatory.

10. Proprietor's Private-room.
11. Principal Bedroom.
12. Dressing-room.

13. Balcony.
14. Conservatory.
15. Bath-rooms.

PREMIATED DESIGN IN THE NÆSON VILLA COMPETITION, CHRISTIANIA.

We referred the other day in our "Foreign" Notes to an architectural competition for a private

villa for Herr Hagman, a professional singer, near Christiania. The competition was confined to Scandinavian architects, and appears to have excited keen emulation. The accompanying illustration is that of the premiated design, by Herr Zettervall, which will, we presume, be erected. It does not appear to English eyes a very remarkable result from a keenly-contested competition, but the illustration may be interesting as showing the present taste in villa architecture in Norway.



THE HYGIENIC CONGRESS AT  
BUDAPEST.

SECOND NOTICE.

THE interest of the discussions of the Congress of Hygiene and Demography was by no means exhausted at the conclusion of the earlier proceedings given in the last issue of the *Builder*. For the medical members of the Congress surprises followed each other rapidly from day to day, as the new experiments made in the three years' interval since the last Congress were developed by the keenest bacteriologists of Europe, in relation to the germic theory generally, and to the epidemics of diphtheria, cholera, and some of the tropical diseases in particular. The sections which most interest our readers were left very largely to the English and French representatives, to whom must be added a famous Viennese architect, Herr Ferdinand Fellner, and one or two Hungarian and Russian engineers. The Rev. C. G. K. Gillespie (certificated Sanitary Inspector) pleaded eloquently the claims of sanitary science on religious teachers in Section VI., and the teaching of sanitary science in schools was dealt with in papers by Dr. Anthony Roche, Professor of Hygiene in the Royal University of Ireland, and other members, but it was in Sections VIII., IX., and X., which usually sat together, that the papers with which we are most concerned were read.

Three German papers were read, with Dr. Karoly, the President of the section, in the chair, on "The Ventilation of Dwelling-houses," followed by an English paper, forwarded by Sir Douglas Galton, on "Heating from a Central Source," but read by Mr. John Slater in the author's absence, and one on a similar subject by M. Emile Trélat, Professor of the *Arts et Métiers*, Paris, read for the author by M. Masson. Mr. Arthur Cates, having now been invited to preside, the two latter papers were read in succession, and were subsequently discussed together.

Sir Douglas Galton's paper, the full title of which was "Central Heating of Residences for Lodgings and Whole Towns," was as follows:—

"The heating of towns must necessarily depend upon the best methods of supplying heat to each dwelling in a group. When this has been determined it may be more convenient to supply groups of dwellings more or less numerous from one source of heat. This might almost certainly be the case with several separate dwellings were they all in one building, as is the case with flats. But the heating, on a combined system, of separate houses is an extension which has been put into practice only in the United States of North America. The first point for consideration is, what is wanted in the heating of a house? This question may be considered primarily under the head of what is the form of heat which is most comfortable, and, in the next place, what is the most economical. There is no question but that comfort in heat depends on radiation. We are practically furnaces in which heat is being constantly generated. This heat is radiated away from us more or less rapidly in proportion to the temperature of our surroundings. When we are in proximity to a very cold body, as, for instance, in the crevasse of a glacier, this heat is given off more rapidly than we can produce it, and we are frozen. When we are in a place where the surrounding objects possess a temperature approaching that of our bodies, which is 98 deg. Fahrenheit, or 36.66 centigrade, we cannot part with our heat with sufficient rapidity, and we die. Comfort lies between these extremes. The simplest method of procuring warmth has always been by means of the open fire. That method warms directly by radiant heat. Before proceeding further it is desirable to have clearly before us the different ways in which heat is applied, as these differences have a very important bearing on comfort in warming. Heat is transferred from the incandescent fuel to the bodies which it warms by conduction, assisted in some way by convection or by radiation. *Conduction* is the transference of heat from one body to another by means of some tangible medium which fills the whole space between the two bodies. For instance, if a poker be held with the other end in the fire, the heat from the fire is transferred along the poker to the hand by conduction. *Convection* is the transference of heat from one place to another by the bodily moving of the heated substances. The warming of a building by hot-air pipes is an illustration of transference of heat both by conduction and convection. The heat from the fire is in the first place communicated by conduction through the plates of the fire-box from the incandescent fuel to the water in the boiler. It is transferred by convection along the pipes which convey the water to different parts of a building

as the hot water circulates. It is again transferred by conduction to the air close to the pipes. This air being expanded ascends and carries the heat with it by convection to different parts of the room. *Radiation* is a form of the transference of heat which is not either conduction or convection, by ordinary matter; that is to say, heat which is transmitted in a manner of which all we know is that it is not convection nor conduction as generally understood, is called radiant heat. Radiant heat warms, to a greater or lesser degree, the solid bodies upon which the rays impinge, but practically passes through the air without warming it. The amount of heat radiated from a body at a given temperature depends on the physical nature of the surface of the body. The hotter the body in proportion to an adjacent body, the greater, proportionally, will be the rapidity with which it emits radiant heat, and the emission of it will be greater in direct proportion to the difference of temperature between the two bodies. In the presence of a cold body an adjacent warm one will rapidly lose heat. If a person in a warm condition sits near a cold wall the radiation from the person's body to the cold wall will cause the sensation of a draught. This is easily tested by hanging a piece of carpet on the wall so as to intercept the radiation, when the feeling of draught will cease.

All these considerations have an important bearing on the application of heat to occupied rooms. Warming and heating in our houses has usually been effected by one of the following methods:—I. The open fireplace in each room; II. Warmed air brought into corridors or rooms by flues from a centrally-placed calorifier or heating apparatus; III. Close stoves placed in the room or place to be warmed; or else hot-water pipes or steam-pipes heated by a boiler in some central position, often at a considerable distance, and carried by the pipes thence to the places where the heat is wanted. Or, again, heat may be supplied by electricity conveyed along wires from a central station. The heat conditions which prevail between the air and the walls or objects in a room are different in each of these cases.

Ist. The open fire warms chiefly by means of radiant heat. Therefore, with the simple open fire the grate selected should, in the first place, be one which contributes radiant heat most effectively. Radiant heat much depends upon a fire with flame. The material used for the sides and back which are in contact with the incandescent fuel should not absorb, but should reflect heat. The height of the grate above the fire should be considerable, because the fire when raised throws its rays upon the floor at a better angle for warming it than when the grate is very low or on the ground. So far as radiant heat alone is concerned it is difficult to improve upon the simple Rumford grate with splayed firebrick at the back, arranged to lean slightly forwards over the fire; whilst, in order to favour the draught, some air should be admitted through the bottom of the grate, and the front bars should be vertical to prevent accumulation of ashes upon them. In all open fireplaces with a good draught a considerable portion of heat is evolved beyond that utilised for warming the room, and even beyond what is necessary for purposes of ventilation. This may be used to warm inflowing air. The ventilating fireplace called the Galton Grate was designed for the War Office with this object. Fresh air is admitted to a chamber formed at the back of the grate, where it is moderately warmed by a large heating surface, and then carried by a flue, adjacent to the chamber flue, to the upper part of the room, where it flows into the currents, which already exist in the room, and with this form of grate and its ventilation, the temperature of a room has been found not to vary in any part to a greater extent than 1 deg. Fahr., or at most 2 deg. General Morin's experiments showed that the proportion of heat utilised in the room by the use of warmed air in this grate was three times as much as that utilised by an ordinary grate.

The main principle of the open fireplace is that it warms by radiant heat. It leaves the air cool to breathe, but it warms the furniture and the walls, and thus prevents these from unduly abstracting heat from the body. The ordinary open fire requires fuel to be continuously supplied in the room by manual labour, and the rooms heated by this means are entirely self-dependent. On the other hand, a gas fire also furnishes radiant heat. It is supplied with fuel brought from a central source of supply, but the products of combustion from a gas fire are comparatively cool, and do not produce the same velocity in the

chimney which a coal fire produces; and, instead of favouring ventilation, it tends to cause the dispersion of those products in the room.

*Warming by Heated Air.*—When hot air is conveyed into a room by flues from a stove or other central source of heat in the basement, it is necessarily warmer than the walls, consequently the walls and furniture of the room are warmed by means of the heat conveyed to them by the heated air, and are thus necessarily cooler than the air itself. The warmed air is less pleasant and invigorating to breathe than cold air. If you take two equal volumes of air, one heated and the other cold, the expanded heated air will contain less oxygen per volume than cold air. For instance, at a temperature of 32 deg. a cubic foot of air weighs 567 grains, which would be distributed in the proportion of 448.8 grains of nitrogen to 118.2 grains of oxygen, whilst at a temperature of 80 deg. the cubic foot of air weighs 516 grains, which would be distributed in the proportion of 408.4 nitrogen, to 107.6 of oxygen. It is probably for this reason that the air of a frosty morning is so invigorating.

The method of warming the walls by means of heated air necessarily leaves the walls colder than the air of the room, and the heat of the body is radiated to the colder walls. Hence, if the walls are to be warmed by the air admitted to the room, the temperature of the warmed air must be raised beyond what is either comfortable or healthy for breathing, and thus if you obtain your heat by warmed air alone admitted direct to the room, discomfort in one form or the other can with difficulty be avoided. A little consideration shows that so far as warming by hot air is concerned it is only in single houses, or public hotels which are compact in their arrangement, that hot air warmed at a central source of supply could be distributed for warming purposes with any regard to economy. In scattered buildings the hot air would lose too large a proportion of its heat in the flues and passages carrying it to its destination. The American Smeed hot-air stove is probably the best arrangement for the direct warming of air where hot water or steam is not resorted to.

*Warming by Close Stoves, or Hot-water or Steam-pipes, or Electricity.*—These methods require separate arrangements for ventilation. Stoves may be of fire-clay or of iron. The fuel may be coal, charcoal, or gas. These would probably be supplied in the room itself. If gas be used as the fuel, then it would be brought in pipes, and would be turned off or on as required in the room. Electricity, as a mode of warming, would similarly be brought from outside. The nature of the material of which the stove is made, and the nature of the fuel, influence the condition under which it distributes heat. A fire-clay stove warms the air slowly. It would not supply radiant heat, but it does not allow of the permeation of impure gases from the fuel. Iron stoves, if heated to a high temperature, would give out a certain proportion of radiant heat, but might allow of the permeation of carbonic oxide through the metal into the air to be warmed. Gas-stoves are convenient in that the fuel is supplied without trouble. But the low temperature of the gases in the chimney favours the occurrence of back draughts. Hot-water-pipes, steam-pipes, and electricity, as at present applied, do not present these inconveniences. There are, however, certain general conditions which affect hot-water and steam-pipes which have an importance for certain uses. The ratio of the emission of heat increases with the temperature. That is to say, pipes heated by hot water under high-pressure convey heat to the air with greater rapidity than pipes heated by hot water at low-pressure, and steam-pipes are more effective than hot-water-pipes, and steam at a high-pressure is more effective than low-pressure steam.

But there is another consideration. Pipes at a low temperature give out their heat to warm the air, but they give out very little radiant heat to warm the walls. On the other hand, pipes at a high temperature, like high-pressure hot-water-pipes and steam-pipes, give out a considerable amount of radiant heat to warm the walls as well as direct heat to warm the air in contact with them. Therefore, high-pressure hot-water-pipes and the steam-pipes present, though in a less degree, the advantages of the open fire, in that they partially warm the walls and furniture of a room as well as warm the air. Plates of iron or copper placed in rooms and warmed by electricity would present the same conditions of warming as hot-water or steam-pipes, according to the temperature of the plates. It is apparent that it is only with the assistance of either gas in the fire.



places or stoves, or of hot-water or steam-pipes, or of electricity, that a combined system of heating many houses from one central source can be arranged, or has been attempted. In the United States the earliest efforts were made to obtain a combined system of heating by steam for towns and villages by Mr. Holly. The broad principle which the Holly Steam Combination Company enunciated is that of furnishing heat from a central source of supply applicable to all domestic purposes, just as gas and water are supplied. The boilers are placed in a convenient central situation. From the boiler the steam passes into the main pipes, and lateral or branch pipes. The maximum steam pressure was about 100 lbs. per square inch. Since, in the conveyance of steam for a long distance, it is essential to guard against condensation or loss, great pains are necessary to cover the steam-pipes with non-conducting material. In order to effect this, the pipe is wound about first with asbestos, followed by hair felt, porous paper, manilla paper, finally thin strips of wood laid on lengthwise, and the whole fastened together by a copper wire, wound spirally over all. This is thrust into a wooden log bored to leave an intervening air-chamber between the pipe and the wood, and of sufficient size to leave from 3 in. to 5 in. of wood covering. By this means it is alleged that the loss of heat is little over 2½ per cent. Careful arrangements have to be made for admitting the steam into the houses, both to prevent loss and to ensure measuring it. It is not intended in this paper to go fully into the engineering details of this method. They can be obtained from the engineers who have constructed works in the United States. The system is especially applicable to countries where the winters are uniformly and persistently cold. In England the variations of temperature are so frequent and rapid, that whilst much heat is required at one part of the day, at another time this is not the case, consequently the frequent changes would make it difficult to provide economically for heating over a large area. The economy of steam heating depends on using low pressure steam and letting the water of condensation flow continuously back to the boilers, so that there should be no waste. This ought to be the arrangement in all isolated houses, hospitals, &c., but it is an arrangement which is not practicable where steam is distributed over large areas. The great advantage of furnishing heat from a central source of supply applicable to all domestic purposes, just as we get our gas and water, is, that it saves the annoyance of handling coal-ashes, kindling, &c.; also the expense of stoves and repairs. In the United States the charge adopted by some of the steam companies for steam was eight shillings per thousand cubic feet of air space per annum. Under this lump sum system a house of 60,000 cubic feet contents, which is about the capacity of a fair class London house, would pay about 24½ a year for heat, whilst an artisan in a model dwelling, which occupies probably from 6,000 to 8,000 cubic feet, would pay from 2½. 4s. od. to 3½. 4s. od. for heat a year, equivalent to from 10d. to 1s. 3d. a week. This is in the United States, where the winters are intensely cold, and where a very considerable amount of heat is necessary during the whole winter. On the other hand, by the introduction of meters made to register so as to pay for the steam actually used instead of by the cubic space, individuals might effect a reduction of cost by cutting off the steam from the radiators in unoccupied rooms. On a review of the whole question, it is evident that much advantage to the population in a town would result from a central source of heat, without the inconvenience of having to carry fuel to every house. In a moderate-sized house the annual consumption of coal will not be less than 20 tons. These are stowed away in cellars, and then raised thence in scuttles which hold about 28 lb. each—that is to say, at least 2,000 separate coal-scuttles have to be taken to various parts of the house, the ashes brought down again, and much labour devoted to removing the dust with which an open fire covers the furniture. Hence the complete use of steam would enable probably one female servant to be dispensed with. In artisans' houses the saving of trouble by having no fires to attend to, no grates to clean, and no coals to carry, would be of much value. In addition to this, each fire deposits much soot in the chimney, which at regular intervals is pushed up into the air by the chimney-sweep, and thus distributed through the neighbourhood, rendering continued cleaning necessary and compelling a large annual outlay in repainting and re-decorating. There is also a great inconvenience to street traffic caused by distributing coals to

every house in every street. It is not, however, certain that steam would supply the most convenient form of heat. There is no doubt that with heating as with lighting, electricity would furnish the most manageable and the most hygienic form of heating. But it would be very expensive. Hence it is probable that eventually, rather than adopt a system of steam-heating, it might be found more simple and economical to supply a cheap form of gas for all of what may be termed the rough part of heating, including cooking; whilst the more delicate final touches in heating for high-class houses could be supplied by electricity.

The paper of M. Emile Trélat treated the theoretical part of the subject in terms almost identical with those of Sir Douglas Galton. M. Trélat drew the conclusion that there are only two modes of establishing in dwellings hygienic conditions of heating. Whether for hotels or private houses the true solution of the problem depended upon the maintenance in the walls of our houses of such a degree of heat as will ensure that the physiological temperature of the occupants will not be disturbed. In the practical application of the theory, Professor Trélat divides dwellings into two classes (a) those which, like schools, are occasionally unoccupied, where the heating apparatus may be employed during the intervals of vacancy, and (b) those, which, like hospitals, are permanently occupied, where the heat must be distributed by radiation. In the latter case stoves with large radiating surfaces should be employed, or the heat must be circulated by means of pipes conveying hot air or water. The solution of the problem of heating dwellings had absolutely no connexion with that of their ventilation.\* In concluding his paper, M. Trélat passed a warm eulogium upon the English open hearth—"Those open fireplaces which cast through the dwelling the bright perspective of brilliant combustion, and afford the delightful convenience of immediately warming one or more of the members of the body on getting home on a cold night."

Professor Banister Fletcher, who opened the discussion, said that Sir Douglas Galton appeared to be of opinion that gas would continue to be the heating and cooking power of the future, and that while electricity might be an elegant luxury, its great cost would prevent its general employment, except among the rich. The remarkable and successful experiment recently carried out in the City of London before the Lord Mayor and a large company, in cooking a dinner by electricity, scarcely seemed to have received adequate appreciation, and the paper also ignored the demonstrations which had recently taken place at King's College, in the economical application of electricity to cooking and other domestic purposes. Of course, it was a matter of common knowledge that by using a thick wire electricity was obtained with great heating but little lighting power, while with a thin wire much light but little heat was given out. But the fact appeared to have been overlooked in the paper. A loss of 2½ per cent. of the steam used for heating purposes in the American apparatus described had been mentioned, but the paper did not say how far the steam had to travel. The cost of steam-heating for a cottage on the principle described was set down at from 10d. to 15d. per week, but if steam could not be supplied at a more moderate rate than that, the working-men in England would not be easily persuaded to adopt that method, whatever might be the practice in America.

Professor Corfield said the principle seemed at least practicable, and he thought it the correct one. Heating should be done by means of radiant heat, and not by means of air previously warmed. If air was previously warmed it would lose a portion of its oxygen, and if we got air short of oxygen we had to breathe a greater number of times to supply the required amount, and that meant more effort. Premises should not be previously warmed.

Mr. Blashill (London) was satisfied that the breathing of warmed air was not refreshing. Some means must be found to make the air warm in very cold winters. In the climate of that country (Hungary) the gas-stove was as much a necessity as the open fireplace in England. He had seen at Hildesheim in Germany a combination stove, well calculated to supply both desiderata, and it was the best kind of stove he had seen for warming buildings in a very cold atmosphere.

The Chairman (Mr. Bates), after a brief criticism

\* It is needless to say that we decline to accept M. Trélat's dictum on this point. L.

from Herr F. Siemens (Dresden), who subsequently read a paper on "Heating by Gas," and remarks by one or two other speakers, wound up the debate. He said the discussion had been of great interest, and was well worthy of the most careful consideration. A point not mentioned he hoped would not be lost sight of—the means of warming in staircases. They ought to guard against the loss caused by letting the air cool during the night, which necessitated a great extra expense for re-heating in the morning. That was avoided in Germany by the use of the stove, as pointed out by Mr. Blashill. The admission made by M. Emile Trélat, who referred to the cheerfulness of the English open fire-grate, was significant, and if they could succeed in combining the cheerfulness of the open fire with the economy of the close stove, as used in North Germany, they would have solved an important problem.

The presidency having been transferred to Herr Steindl, architect of the new Houses of Parliament of Budapest, recently illustrated in the *Builder*, several German and Hungarian papers were read on heating by gas and electricity.

In other sections papers were read on the Shone system of sewerage, as carried out at Arad, in Hungary, by Mr. Parecz, Municipal Engineer of Arad; by M. Sijmons, C.E., of Rotterdam, on the "Liemur System of Sewage Treatment, as Carried out at Amsterdam"; by Dr. J. C. Thresh, Medical Officer of Health to the Essex County Council, on the "Hygiene of Drinking-Water"; by Mr. H. Robinson, C.E., on "Sewage and Water Purification by Filtration"; and by Dr. F. Stevens, D.P.H. (Camberwell), on "Men Employed in Sewers," the author taking a favourable view of the hygienic conditions under which such men carry on their occupations.

At the third sitting of the united sections dealing with the Hygiene of Public Buildings and Dwellings among the most important papers read were those of Mr. Th. W. Aldwinckle, F.R.I.B.A., on the "Planning of Fever Hospitals," and of Herr Ferdinand Fellner, architect, of Vienna, on the "Protection of Theatres from Fire." Mr. Thos. Blashill, L.C.C., being unanimously voted to the presidential chair.

The *Planning of Fever Hospitals*.—Mr. Aldwinckle's paper was practically a description of the new Fever Hospital at Shooter's Hill now in course of erection from the author's designs for the Metropolitan Asylums Board, of which the following are the leading points:—

The Asylums Board having found themselves, during the scarlet fever epidemic in London of 1892-3, in a serious deficiency as regards fever hospital accommodation, decided (after erecting two temporary hospitals) to erect three permanent fever hospitals, each for 500 beds, and the first one to be commenced was the Brook Hospital, the drawings for which were laid by Mr. Aldwinckle before the Congress. Before issuing their instructions for the preparation of plans, a specially-appointed Committee of the Asylums Board made a most exhaustive inquiry, extending over several months, as to the necessary requirements for a large fever hospital, and visited all the important and modern institutions of a similar character, with the result that the instructions issued to the architect were of the most complete and comprehensive character, and having been printed, formed, in the opinion of the author, the most complete and advanced text-book in existence on the subject of the requirements of a fever hospital. The Brook Hospital site is one which fulfils nearly all the requirements of an ideal hospital site. Placed at a level of over 200 ft. above the sea, and facing northwards towards Shooter's Hill-road, the building can be arranged in terraces facing the south, so as to be shielded from the north and east winds. The main principles on which the hospital is designed are:—

Separate entrances for infected and non-infected business.

The separation of the staff quarters from infected buildings.

The complete separation of diseased cases.

The isolation of alien diseases.

The provision of abundant light and air to all buildings.

The following is a general description of the plan. In the front portion of the site are placed the several administration buildings, such as the official block, the kitchen and stores, the matron's office and needle-room, the doctor's residence, and three homes, respectively for the nurses, female servants, and male servants. The main portion of the hospital proper, or the infected building, stands to the rear of the





THE BUILDER. SEPTEMBER 22, 1894.

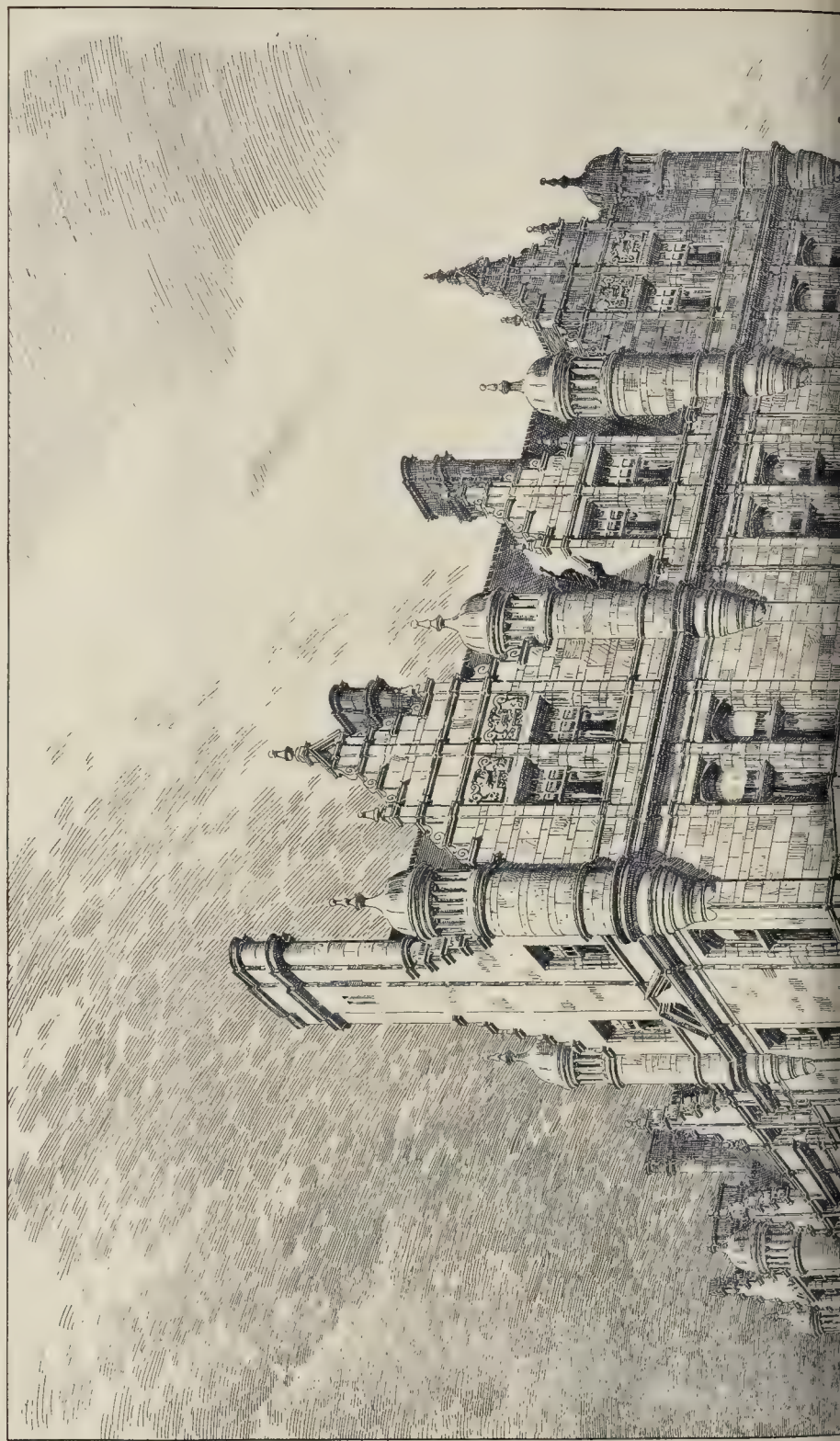






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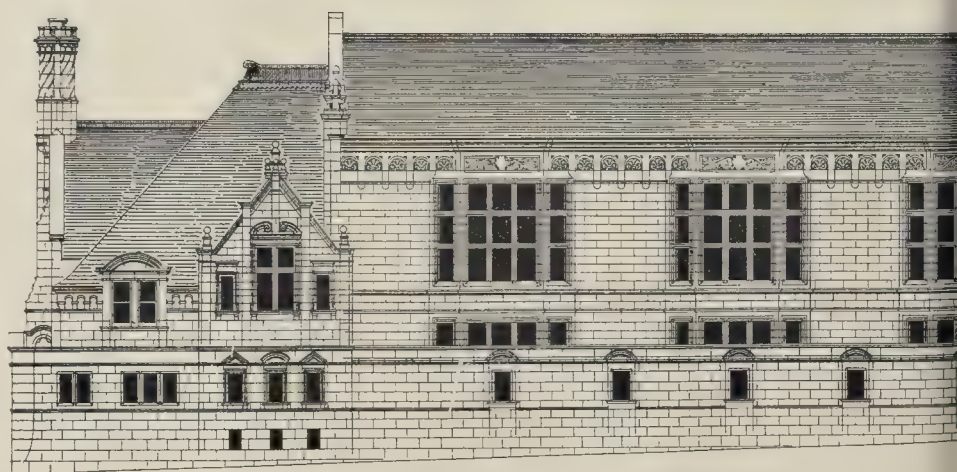
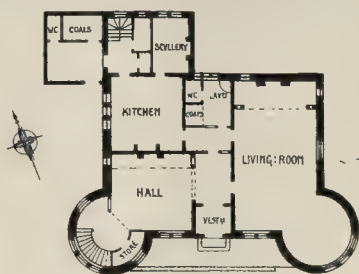
NEW CONSERVATIVE CLUB HOUSE, GLASGOW.—Mr R W Edis, F.R.I.B.A., ARCHITECT.

Royal Academy Exhibition, 1894.













A SUMMER COTTAGE  
FOR THE VNDERCLIFF  
NITON ISLE OF WIGHT  
VICTOR T. JONES-ARCHE



PORTION OF A DESIGN FOR BEXHILL LOCAL BOARD OFFICES  
By Mr THOMAS DAVISON, A R I B A

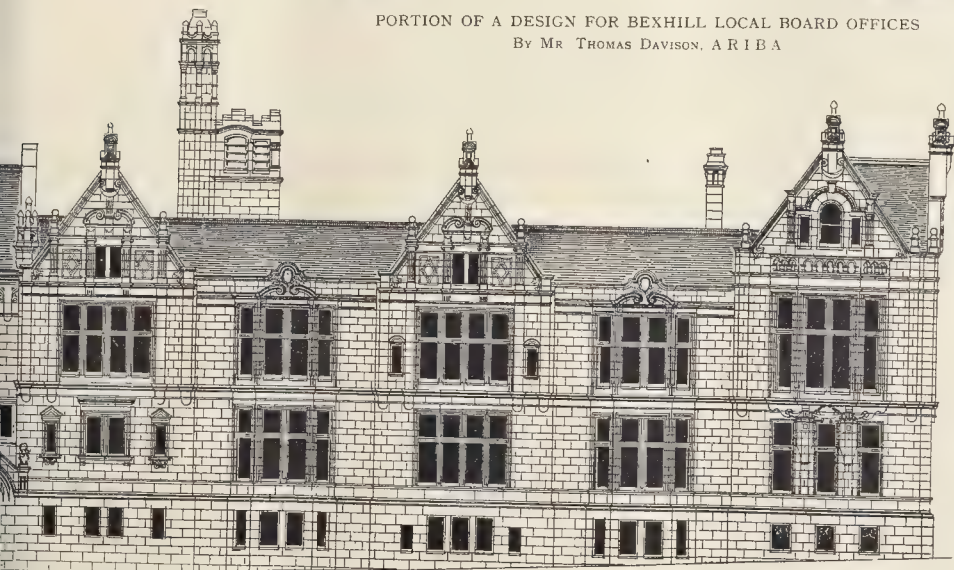
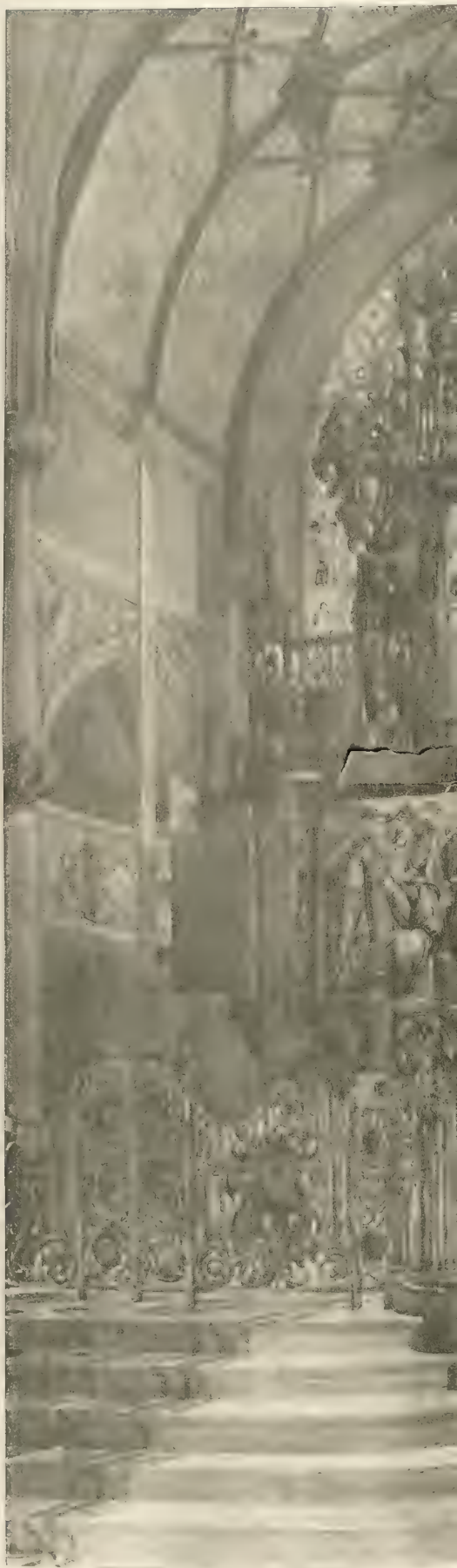


PHOTO. THE "GRACE" N. 5. 17. 18. J. EAST HARGREAVE STREET. PETER. HANE. 8. 17.

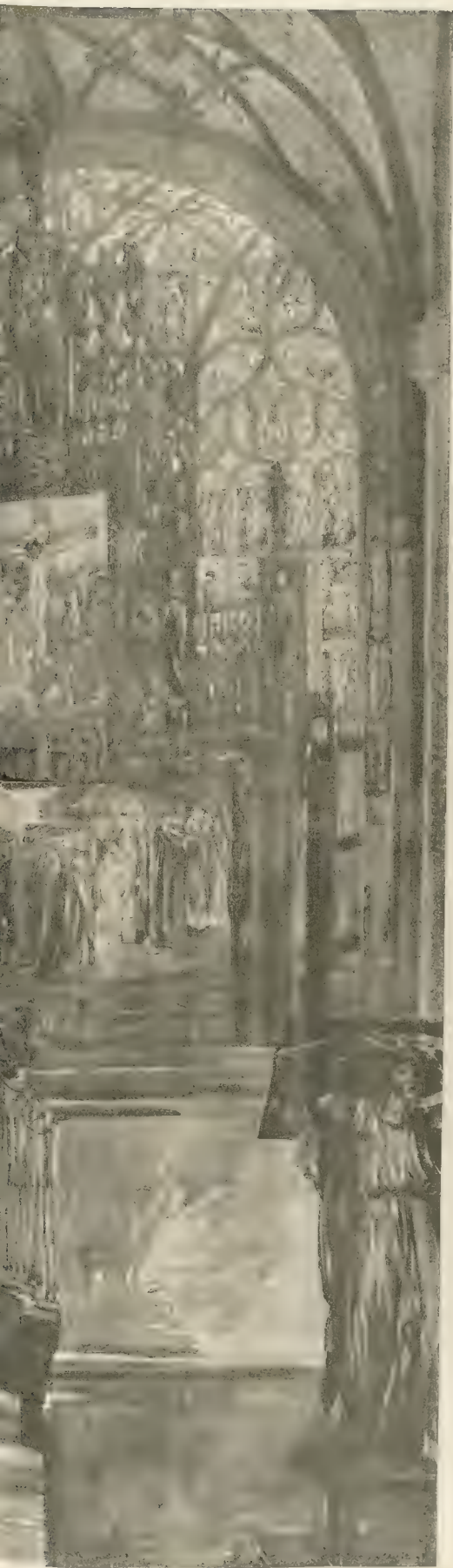


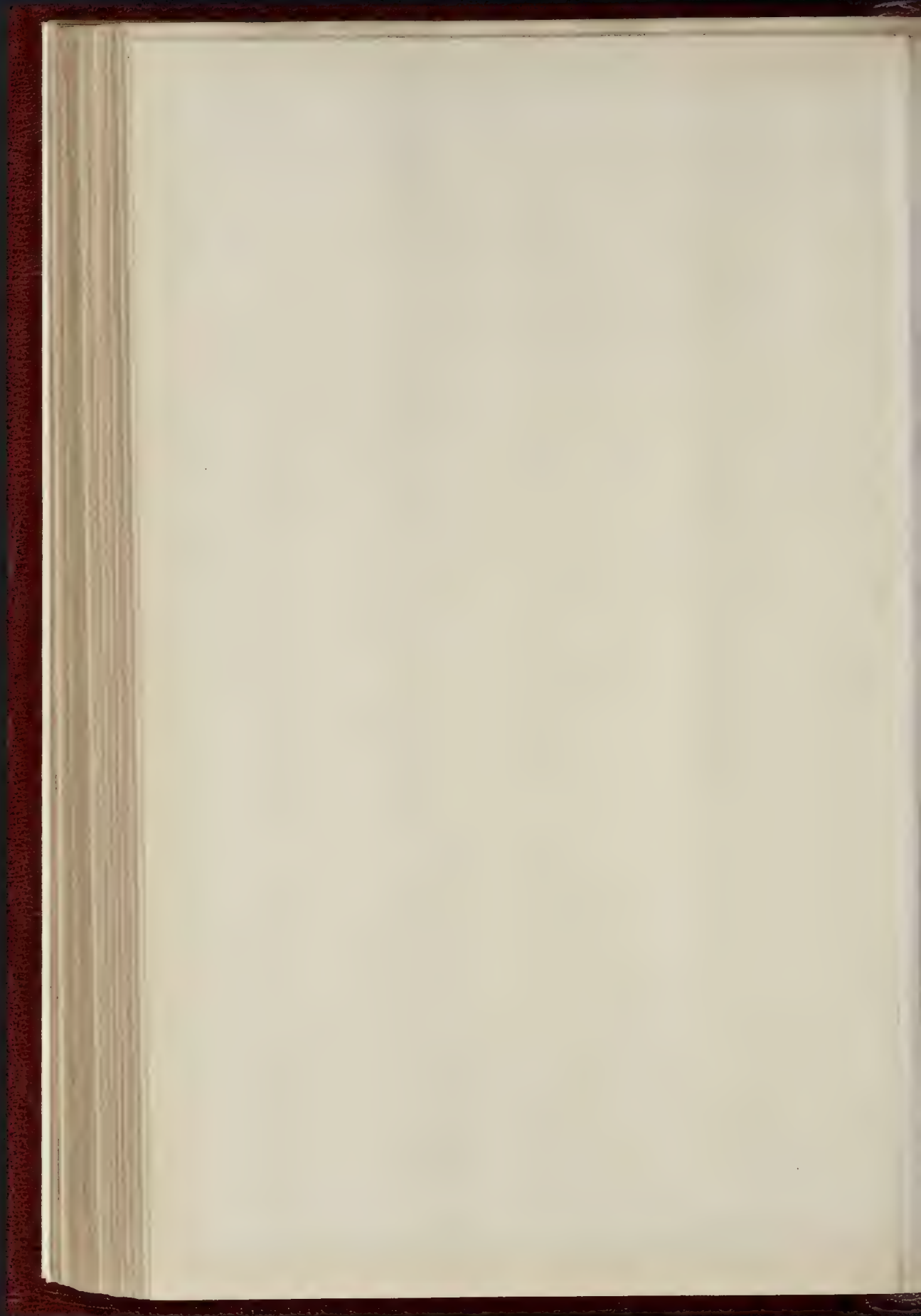














administration building, and well separated therefrom, and consists of eight two-storied pavilions for scarlet fever, four similar but shorter portions for diphtheria and enteric fever, and six one-storied pavilions for isolation wards. These pavilions are connected with each other and with the administration building by means of covered ways, having open sides. There are two entrances to the hospital from Shooters' Hill-road, both being controlled from one porter's lodge. The "infected entrance" leads to the receiving wards, main pavilions, and laundry; and the "non-infected entrance" leads to the official block, store-yard, and staff quarters. By this arrangement persons from the outside, having business with the hospital, are not in any way brought into communication with infected buildings. This is particularly the case with the store-yard, which is immediately opposite to the "non-infected entrance."

The several homes for the staff have been arranged upon the principle that each home should have the *resident supervisor* of the superior officer immediately responsible for its discipline. Thus the matron will reside in the Nurses' Home, the housekeeper in the Female Servant's Home, and the Steward's House will adjoin the Men-servants' Home. The nurses' home (for 104 nurses) is arranged as three separate blocks (one for night nurses only), and the mess rooms and sitting and recreation rooms are of one story only, with open roofs. All the main corridors of this home have large bay windows in the centre of one side, for light and ventilation.

There are eight main pavilions for scarlet fever, all of the same type. Each pavilion consists of two floors, the ground floor being on an average 6 ft. above the ground. The staircase communicating with the upper floor is entirely cut off from any connexion with the lower floor. Each main ward contains twenty beds, and each bed has a lineal wall space of 12 ft., a floor area of 156 ft., and a cubic space of 2,028 ft. There is also on each floor a separation ward for two beds. This ward is for patients of the same class of disease, but who require special treatment or attention. Each separation ward has its own water-closet with intervening lobby with cross ventilation. The duty-room or ward-sculery is so placed that it directly overlooks both the main and separation wards. The bath-room and lavatory are at the corridor end of the ward. The turret or annexe for water-closets, &c., is in the centre of the east side of the main ward with an intervening lobby with cross ventilation. It will contain two water-closets, a slop-sink, and a scalding-sink for bed-pans. All these will be of the "Bracket" type, so as to leave the floor clear for washing down. These floors, as well as those in the bath-rooms and lavatories, will be laid with a fall towards a glazed channel discharging into an external waste-pipe, so that the floor can be cleaned daily with the hose-pipe. The administrative corridor of a ward pavilion is important, as much business is transacted therein. This corridor is well lighted by a bay window 12 ft. wide. Leading from this corridor are a linen store, and a ladder having a north light.

The warming and ventilation of these wards must be considered together. The wards will be warmed partly by open ventilating fireplaces, and partly by a low pressure hot-water apparatus, with copper radiator under the windows, enclosed in cast-iron cases with brass lid and wire gratings. These cases communicate through the wall with the external air, which is warmed by impinging upon the copper coils and then enters the ward. The inlet ventilation of the wards is by the following means:—By windows on both sides, having hopper sashes close to ceiling-level; by the ventilating stoves and radiator cases above described; and by galvanised-iron hit-and-miss ventilators placed in the external walls at the floor-level. The exhaust ventilation is thus effected:—By the open windows above described; by the open fireplaces; and by vertical shafts, lined with glazed bricks, and terminating about 10 ft. above the roof, in which an upward current is caused by steam copper coils.

The wards for diphtheria and enteric fever will be of similar arrangement, but the main wards, 90 ft. long, will contain only twelve beds, and each bed will have a lineal wall-space of 15 ft., a floor area of 195 ft., and a cubic space of 2,535 ft. These large areas, which greatly add to the cost of the hospital, were only decided upon in deference to the unanimous opinions of medical experts. The floors of all wards will be of wax-polished Indian teak. The walls will be finished with Keene's cement worked to a polished

surface; and all internal angles, both vertical and horizontal, will be rounded. The laundry is placed to the west of the site, and will consist of two separate and distinct laundries, one for patients and one for the staff. Attached will also be the disinfectant and destructor. The hospital will be lighted throughout with electric light.

Attached to the hospital, but under separate management, will be an ambulance station. This will comprise stabling for twenty horses, sheds for eighteen ambulance, mess-room and cubicles for twenty-four male servants and eight female servants, a complete home for eight small-pox nurses, a complete laundry, and a residence for the superintendent. The cost of the hospital and ambulance station, including land, when completed and furnished will be about 250,000/.

In the discussion which followed the reading of the paper, Mr. M. W. Ackworth (Metropolitan Asylums Board), Mr. Councillor Dick and Mr. Councillor Macfarlane (Glasgow), Mr. Pollard (Edinburgh), Professor Smith (King's College), Professor Banister Fletcher (City of London), and one or two foreign members took part in the discussion.

Mr. Ackworth criticised the design on economical grounds. He thought the interests of the ratepayers had been entirely left out of sight, the cost of 500/ per bed being unprecedentedly extravagant.

Mr. Dick expressed similar views, and objected to two entrances as an element of danger.

Mr. Pollard adduced a fact with regard to Edinburgh which, in his opinion, thoroughly justified a liberal expenditure of money, even when raised by the rates, where the expenditure was wisely directed, and an adequate object was sought to be obtained. In Edinburgh 2,000,000/ had been spent in the last few years in schemes of improvement, but as a result of those improvements the rateable value of property had been augmented to the extent of no less than 4,000,000/.

Mr. Macfarlane said London was a large city, and ought to have the best hospital that could possibly be built. As a representative of Glasgow, he would accept with pleasure such an hospital.

Professor Roger Smith said this very question of cost had received the greatest consideration. At first plans had been prepared showing a considerably less cost per bed, but they were referred back, and the plans finally approved involved an increased cost estimated at some thousands of pounds. The cost might have been lessened by omitting the ambulance station from the design, but the hospital being away at the south-east corner of London, it was thought better to take advantage of the building of the hospital to provide the district with a much-wanted ambulance station. Mr. Councillor Dick had objected to the two entrances, but the porter's lodge was situated between them, and no one could go in without being seen.

Professor Banister Fletcher thought the discussion should be based on the fact that this was an experimental hospital, in which the chief object was to obtain the best plan of the best hospital that could be erected. In such an experiment the question of cost was not a paramount consideration. It would often happen that where a building was properly planned, the cost of maintenance and management would be reduced in consequence. The first necessity was to obtain such a plan that disease could be best combatted and thus the term of occupancy by the patient be reduced. This would in itself be a saving to the ratepayer. The ratio that rates and taxes bore to rent in England was lower than in continental countries. He had been informed that in Vienna, for instance, the rates were as high as 40 per cent. of the rent or the rateable value.

Mr. Pollard (Town Councillor, Edinburgh), then read a paper forwarded by Mr. Campbell Douglas (Glasgow), on the same subject. The planning of a fever hospital involved so many special considerations, that the skill of the best architects was severely taxed. The general principles as to the selection of aspects, convenience of management, complete separation of the wards from the administrative departments and the staff, were common to all such buildings, but there was plenty of scope for great diversity in architectural details. It was not necessary that a fever hospital should be far removed from centres of population. The small-pox hospital of Edinburgh, which was situated in the Canongate, was not found to be an evil, notwithstanding the evidence on the other side in the case of Sheffield. In the paper, particulars were given of the small-pox hospital on the banks of the Clyde at Glasgow, which contained, in 13 pavilions, 390 beds (30 in

each), a remarkable thing about which was that in the more modern one-story hospital at Glasgow the death-rate was 10 per cent., while in the old three-story building in the Canongate at Edinburgh the death-rate was only 6 per cent. Hospital accommodation ought to be provided in proportion to, at least, 1 per 1,000 of the population, but 1½ per 1,000 was better. He recommended for hospitals an American portable bath, formed of "Fibrine," a sort of *papier maché*.

Mr. Blashill, having briefly wound up this portion of the discussion, vacated the chair in favour of the local president.

(To be concluded in our next issue.)

## Illustrations.

### STUDY FOR REREDOS FOR HOLY TRINITY CHURCH, CHELSEA.

THE drawing now illustrated is one of a series of studies made for the proposed new reredos in Mr. Sedding's church of the Holy Trinity, Sloane-square. It was not intended to be in any way final, but to be used as a suggestion, a guide to future efforts. It embodies the results of many elevations done to scale, and was sketched in perspective as it would probably appear in relation to the surrounding architecture. No attempt was made to give atmospheric effect, which would have been entirely out of place, the object being to get a harmonious arrangement of masses, to realise relations, to produce a pattern of varying forms in various positions, to make a mosaic by mingling masses of material; it was an effort, in fine, towards what my friend Mr. J. Attwood Slater happily called the "Interference of forms," "the nearest approach in form to iridescence in colour." This latter would of itself give reason for, and justification of my intention to put a high reredo in front of the east window, instead of weakly subordinating it, as many critics desire.

It has long been a commonplace in the design of interiors that the interest of the spectator should be excited, and his attention compelled to some object of interest, before passing to the real end and termination of the building. The bounds and limitations of the view should be rather suggested than brutally defined, gently led up to than abruptly declared.

By these means only can mystery be obtained, the spirit of the spectator kept on the alert, and that most delightful of all sensations, the expectation of surprise, awakened and gratified.

More than this, to say, as many do, that because a certain window has been designed, nothing should be placed in front of it, is to assume that the building was made for the window, and not the window for the building. It is to forget that in the Christian Church the altar and its surroundings form the central feature, the reason of the building's being, and that, though the eastern wall be built of precious stones, the window glazed with gems and jewels, yet reredos and tabernacle tower over all.

H. WILSON.

\* \* We are not quite sure whether we, who were among the "critics" referred to, are quite converted; we still have an impression that a very large and elaborate traciced east window is meant to be seen from the church. But we are quite sure that many of our readers will enjoy Mr. Wilson's characteristic defence of his position as much as we do.—ED.

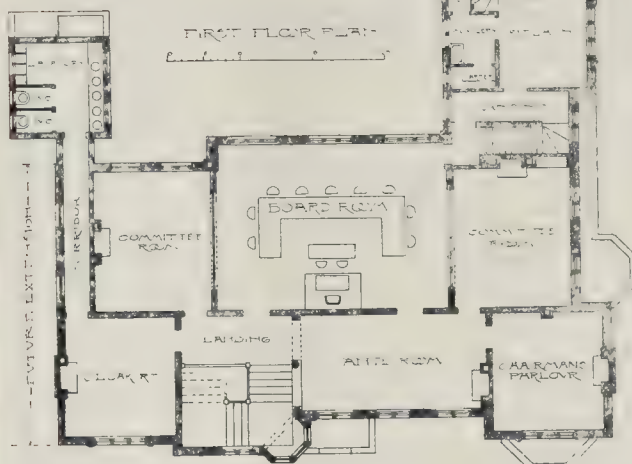
### COMPETITION DESIGN FOR DARLINGTON MUNICIPAL BUILDINGS.

We are unfortunately unable to give the plans which would have explained this elevation, for the reasons referred to in our "Note" on page 150 ante—viz., that all the writing in the plans sent to us would have become illegible on reduction of the plan to the necessary size for our page, and it would therefore have been unintelligible. The elevation, which was exhibited at the last Royal Academy Exhibition, shows the side view of the design, which was submitted in competition by the author, Mr. T. F. Pennington. The left-hand portion of the elevation shows the flank of the large hall for public meetings, and the right-hand portion the municipal offices, divided on the ground floor by a transverse corridor with entrances at each end, one of which is shown in the elevation. The Mayor's suite of rooms are at the right-hand of the block, the large window at the extreme right of the elevation being that of the committee-room which forms part of the suite. In the



# LOCAL BOARD OFFICES, BEXHILL.

COMPETITION DESIGN FOR THE LOCAL BOARD OFFICES, BEXHILL.



public hall portion of the elevation, the long low windows beneath the principal ones serve to light some seats which are rather ingeniously contrived in the bays. The single windows below light an emergency corridor for exit.

The plan was arranged so that the public hall could, if desired, be used in connexion with the Mayor's reception rooms; and, at the same time, it could be entirely cut off from the municipal buildings, if in use in the daytime, by the locking of the doors of inter-communication.

## "SUMMER COTTAGE" FOR THE ISLE OF WIGHT.

THIS house was designed to meet the requirements of a family needing a seaside residence, containing only one large living-room, about 30 ft. by 18 ft., a good hall, which could also be used as a sitting-room, and several bedrooms and the usual offices. A large balcony for meals in Continental fashion, and a verandah or "stoop" below, were also provided.

The building was to be principally of concrete, formed of shingle from the beach, the face of the lower portion finished yellow roughcast, the upper walls having bands of grey brickwork, the decoration round the doorhead being in sgraffito. The roofing was to be of grey slates, and the whole of the woodwork painted white.

VICTOR T. JONES.

## COMPETITION DESIGN FOR LOCAL BOARD OFFICES, BEXHILL.

THIS drawing was prepared for the Royal Academy Exhibition, from a design submitted in competition for the Local Board Offices, Bexhill. Red brick, Bath-stone, and tiles, with creosoted timber in the gables, were the materials proposed for the execution of the work.

The original drawings formed one of the three sets placed by the board. A plan of one floor is appended.

## CONSERVATIVE CLUB, GLASGOW.

THIS is a reproduction of a perspective drawing of this building, which was exhibited in the Royal Academy this year. We regret that we are unable to give any plan or description of it owing to the absence from town of the architect, Col. Edis, of which we were not informed until

it was too late to make any change in the publication.

## Correspondence.

To the Editor of THE BUILDER.

### "PICTORIAL ARCHITECTURE."

SIR,—I have noticed in your journal of September 15 a letter signed "Student," referring to my picture, "The Trial of Joan of Arc," with Editor's footnote. May I state in reply that though the effect and lighting of the background were studied in St. Bartholomew's Church, an inspection will show that the architectural details are in many ways distinctly not the same, excepting the Norman work, which is identical with that in France.

The alterations I made in the Gothic some were based upon examples given in M. Viollet-le-Duc's "Dictionnaire Raisonné," such as the flamboyant panels in the recess, which in no way resemble English architecture. I should mention that the Chapel of Rouen Castle, in which the trial took place, has long since been destroyed.

The indifference to details mentioned in your Note is not correct in my case, as I took great pains when painting the picture to visit the locality to obtain all possible information.

FRED ROE.

\*\*\* The very small bit of "flamboyant" detail in the tracery of one panel might well escape notice, and, after all, it does not represent anything that is not found occasionally in late English Decorated work. The Norman capital is not exactly the same in France; it very soon took an English form, and if Mr. Roe looks under "Chapiteau" in Viollet-le-Duc, he will see that the French architect only gives the duplex form of cushion capital as characteristic of France, and refers to that as found "all over Germany and in the Rhine provinces of France." The general aspect of the interior in the picture is certainly English, and, whatever painters may think, to architects it must seem an odd proceeding to seek local colour for a French interior by making a study from an English interior.—ED.

## BUILDING IN GUERNSEY.

SIR,—Will you kindly allow me to inquire through your columns whether any reader can furnish me with the names of two or three reliable builders in Guernsey, Channel Islands; also (roughly speaking)

to what extent prices exceed London prices for domestic work.

J. H. GREGORY.

## MÈTRES AND FELT.

SIR,—Kindly help a dull boy ament the Egyptian competition. He has drawn a design in English feet of the size demanded, namely 1500 m., but it is necessary to figure it in mètres and millimètres. What is the rule? or does any book contain a table?

Holtzapffel says the mètre is equal to 39.37 Murray (the publisher) in "Guide to France," 3.28 Morgan, 3.37.—Yours respectfully, HERBERT.

\*\*\* A French mètre is, according to our information, 3.2809 English feet, which coincides almost exactly with "Murray."—Ei.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XII.

**A**MONGST the principal materials employed in waterworks construction the following are included:—Iron (cast and wrought), steel, copper, lead, zinc, tin, brass, gun-metal or bronze, stone, bricks, concrete, cement, lime, gravel, sand, clay, and wood.

Cast and wrought iron and steel are made from "pig-iron," which is manufactured from iron ore. Pig-iron is the name given to the crude unpurified metal in the form that it is first obtained from the blast furnaces, and is classified as:—1. Bessemer, 2. Foundry, 3. Forge.

Bessemer "pig" is dark grey, contains a large proportion of free carbon, a small quantity of silicon and manganese, and is practically free from sulphur and phosphorus. It is principally used for conversion into steel (Bessemer process). Foundry "pig" contains a large proportion of free carbon, and is therefore specially adapted for foundry work. Forge "pig" contains little free carbon, and is therefore adapted for conversion into wrought-iron.

Cast-iron is obtained by remelting foundry "pig" in a small furnace called a cupola. Inferior castings are sometimes run direct from the blast furnace. Cast-iron is sub-divided into:—1. grey, 2. white, 3. mottled.

Grey cast-iron is made from the best foundry pig, and produces the best castings. White cast-iron is made from forge-pig, and is only used for the most inferior descriptions of castings. Mottled cast-iron is a mixture of the grey and white varieties. If a little nitric acid be applied to clean fractured surface of cast-iron it will give black stain with the grey variety and a brown stain with the white variety. White and mottled cast-iron do not rust so readily as the grey variety. Chilled castings are produced by using metal moulds.

Malleable cast-iron is produced by subsequent heating castings in an annealing oven with some substance containing an excess of oxygen. The oxygen combines with the carbon in the casting to a certain depth, depending upon the length of exposure, rendering that portion of the casting similar to wrought-iron.

Cast-iron contains a large percentage of carbon (from 2 per cent. to 6 per cent.). It is chiefly used in waterworks construction in the manufacture of pipes, the bodies of sluice and other valves and appliances, in the heavy parts of engines and pumps, for roof-trusses, and for ironwork generally which will not be subjected to tension.

Wrought-iron is generally prepared from forge pig, by puddling, after which it is rolled and converted into "piddle-bars." The different qualities of "piddle-bars" are:—1. Puddled rough bars. 2. Merchant bar, or common iron. 3. Best bar. 4. Best best bar. 5. Best best bar. 6. Scrap bar; which is again subdivided into "best scrap" and "best scrap."

Wrought-iron is practically free from carbon and should not contain more than 15 per cent. Wrought-iron is chiefly used in waterworks construction in the manufacture of tubes, for roof-trusses, girders, and for iron-work exposed to tension, or where forging is necessary.

Steel is defined by Dr. Percy as "iron containing a small percentage of carbon, the alloy having the property of taking a temper." It contains from 12 to 15 per cent. of carbon, and is, therefore, in composition, midway between cast and wrought-iron. Steel is manufactured two ways:—

1. By extracting a portion of its carbon from iron. 2. By adding a portion of its carbon from steel.

\* Inches, we presume, and the two succeeding figures, feet. Our correspondent is not very precise in his way of stating things.—L.



cast-iron (Siemens' process). 2. By adding carbon to wrought-iron (Bessemer process).

The principal varieties of steel are:—

1. Filter steel. 2. Cast steel. 3. Mild steel.

4. Puddled steel.

Steel is chiefly used in waterworks construction for tubes, and largely in the manufacture of engines and pumps, for girders, and generally where high tensile strains have to be supported. The use of steel is rapidly superseding cast and wrought iron for most engineering purposes.

Copper is principally employed for roses or strainers for pumps, or at outlets to reservoirs; also for floats for ball-taps, &c.

Lead is used for joining cast-iron pipes, for making distributing-pipes, for weighting pump-valves.

Zinc is principally used for cisterns, covering roofs, and for covering iron to protect it from rusting (galvanising).

All wrought-iron tubes used for distributing water should be galvanised. This is effected in the following manner. The iron is cleaned, and after being heated, is dipped into molten zinc, which forms a protecting coating without injuring the iron.

Tin is used for coating water-pipes internally, so as to protect them from the action of the water.

Brass is an alloy consisting of copper and zinc, in proportions varying from 2 to 18 of copper, to 1 of zinc. Brass is used for bushes and bearing surfaces, but is inferior to bronze. It is largely used for valves and taps.

Gun-metal or Bronze is an alloy of copper and tin.

Soft Gun-metal contains 8 parts of tin to 92 of copper. Hard Gun-metal, 18 parts of tin to 82 parts of copper. Bell-metal, 23, or 23, parts of tin, to 76, or 77, parts of copper.

Bronze is fusible, and makes good castings. It is soft, uniform in texture, and wears evenly, and is therefore specially suitable for bearing surfaces, producing little friction. Its tenacity is high, and it does not corrode. It is extensively used for pump-barrels, valve-faces, slides, and screws, and also for making the best valves and taps.

The following table, taken from Unwin's "Machine Design," gives the safe limits of stress, at a live or varying load, to which most of the materials described above may be exposed:—

Material.	Tension.	Compression.	Shear.
Cast-iron .....	3,600	10,400	2,700
Wrought-iron Bars .....	10,000	10,000	7,800
"    Plates .....	10,000	10,000	7,800
Soft Steel, Untempered .....	17,000	17,000	13,000
Cast .....	52,000	52,000	38,500
Copper .....	3,600	3,120	2,300
Brass .....	3,600	—	2,700
Gun-metal (or Bronze) .....	3,120	—	2,400

Stone is used in waterworks construction, in building the walls of reservoirs and filter-beds, in the erection of engine and pumping houses, and in the manufacture of concrete. Except, however, where stone is plentiful and easily worked, masonry is generally superseded by brickwork or concrete. Any hard stone may be used for concrete, though limestone perhaps give the best results.

Bricks are almost indispensable in waterworks construction for the purposes mentioned above in connexion with stone, and often form a heavy part of expense.

The best quality of bricks should be used, especially for outside work. The cost of these is, however, frequently prohibitive, and then the local productions, if there are any, must be carefully inspected by the engineer. Economy only reigns when efficiency has been attained; but the efficiency of a material depends upon what is required of it. The varieties of bricks depending on the materials used and the subsequent manipulation are almost endless. For general work, however, the variety known as "Stocks" is well suitable. These are hard-burned bricks, well-shaped and sound. Staffordshire blue-bricks are best for coping purposes. Good bricks should be sound, free from cracks and flaws, and free from lumps of any kind (especially lime). They should be regular in shape, uniform in size, their arrises or edges should be square, sharp and sharply defined; their surfaces should be even, not hollow, and not too smooth. They should not absorb more than one-sixth of their weight of water. They should be hard and strong so thoroughly that there is incipient vibration throughout. They should give out a ringing sound when struck against one another. The cost of brickwork is calculated by the rod or the cubic yard. A rod of reduced brickwork consists of 272 superficial feet, one and a-half

bricks in thickness, and is equal to 11½ cubic yards. The following estimate of the cost of brickwork for a small reservoir may be useful as indicating the points to be included.

#### Cost of Brickwork per cubic yard.

	s.	d.	s.	d.
400 Stock bricks at 30s. per m.....	12	0		
Cartage .....	3	0		
1 to 4 { 1½ bushels Portland cement at 3s. 9d. ....	5	0	15	0
{ ½ bushels sand at 1s. 1½d. ....	6	0		
Labour—Bricklayer: 5 hrs. at 6d. ....	2	6	11	0
"    —Labourer: 5 hrs. at 3½d. ....	1	5½	3	11½
			£1	9 11½

Say 30s. per cubic yard.

In this instance the bricks were obtained from a local brickyard, and were of inferior quality, but good enough for the work. A thoroughly good class of bricks would have cost 66s. per thousand, including railway carriage and extra haulage. The Portland Cement was Hilton & Anderson's, and cost 10s. 2d. per cask, less 3s. for returned empties, or 43s. per ton nett., on rail in London. There was no local sand suitable for mixing with cement. The sand estimated for was sea-sand, costing 4s. per ton on rail, and to this had to be added heavy railway carriage and haulage.

Brickwork in reservoirs should always be laid in Portland cement or the best hydraulic lime.

Concrete is extensively used in waterworks construction, both for foundations and for entire structures. The materials for concrete are:—

1. The aggregate or body. 2. The matrix or mortar.

The aggregate may consist of broken stone, slag, bits of brick or almost any hard material. It should be broken to about a 2½-in. gauge. The matrix is either lime or cement sand. The proportions in which the aggregate and matrix are taken should depend upon the proportion of void to solid in the former. This can be found out by filling a water-tight box of known capacity with the aggregate, and then noting the quantity of water that can be poured into the box without overflowing.

One cubic yard of stone, broken to 2½-in. gauge, contains 10 cubic ft. voids; one cubic yard of do., broken to 2-in. gauge, contains 10½ ft. voids; one cubic yard of do., broken to 1½-in. gauge, contains 11½ cubic ft. voids. Shingle contains 9 ft. cubic voids. Thames ballast (which contains the necessary sand), contains 4½ cubic ft. voids.

If the aggregate consists of stones of various sizes, the voids will be reduced. When the concrete is intended for foundations where strength is necessary, and imperviousness is immaterial, the matrix may be slightly less than the voids. If, however, imperviousness is the first consideration the matrix must exceed the voids.

The following is an estimate of the cost of concrete for the work above referred to:—

Materials for 1 cubic yard of concrete (6 parts broken stone to 1 part mortar)—Broken stone 6 parts = 27 cubic ft.; sand 2 parts = 9 cubic ft.; Portland cement, 1 part = 3½ bushels.

#### Days of a Bricklayer's Labourer.

	Per cubic yard.	Hurst's Handbook.
Measuring the materials .....	04	
Turning over twice .....	06	
Filling into barrows .....	05	
Wheeling, say 25 yards .....	03	
Levelling in layers .....	02	
Ramming .....	03	
	23	

#### Estimate per Cubic Yard of Concrete.

	£	s.	d.
Broken stone (2½-in. gauge) 27 cubic ft. at 2s. 6d. ....	0	2	6
Sand, 9 cubic ft. at 17s. 6d. per ton. ....	0	7	10½
Portland Cement, 3½ bushels .....	0	13	2
Labour, 23 days at 2s. 11d. ....	0	0	8½
	£1	4	3

The concrete should be mixed dry on a wooden platform, the materials being measured by means of wooden boxes without bottoms, turned over twice, sprinkled with sufficient water through a rose, turned over until thoroughly mixed, filled into wheel-barrows, wheeled to the site, tipped gently into position, and well rammed in 12 inch layers. One cubic yard is sufficient for one mixing.

Cement.—The cement most used in waterworks construction is Portland cement. It is used for making mortar, concrete, and for rendering. The following estimate in connexion with the reservoir above referred to for rendering may be useful.

Cost per superficial yard of rendering on brick-

work, ¾-in. thick, 1 of Portland cement to 2 of sand:—

	s.	d.
Portland Cement 21 bushels at 3s. 9d. 0 9½		
Sand 42 " " " 1s. 1d. 0 5½		
Plasterer and Labourer 08 days 14s 7d. 1 2		

Portland Cement is grey in colour, weighs from 112 lbs. per struck bushel, and should be ground so fine that after passing through a sieve containing 2,500 meshes to the square inch, the residuum shall not exceed 10 per cent. Briquettes made from the cement and immersed in water, when sufficiently set, for seven days, should be capable of sustaining a tensile stress of at least 300 lbs. to the square inch.

Lime.—Hydraulic limes or limes capable of setting under water, are frequently used in waterworks construction, either alone or mixed with cement. The blue and brown Lias limes are examples. If of good quality they give excellent results.

Gravel is used for filter-beds and for making concrete. In either case it must be clean and free from vegetable matter.

Sand is used for filter-beds, and for mixing with cement and lime for mortar, and for making concrete. For filter-beds the sand must be clean, uniform, but not too fine in grain, sharp, and approaching pure silica as closely as possible. For mortar and concrete the sand should be perfectly clean, free from clay or other impurities; the grains should be sharp and angular.

Clay is largely used for puddling. It should be free from sand and vegetable matter, and should not contain soft friable stone; but the presence of a certain amount of gravel in it is advantageous, and may be necessary ("Waterworks Engineering," by Turner and Brightmore). The clay should be freed from all vegetable matter, and should be exposed to the weather or "weathered" for as long a period before use as possible. It should then be spread out flat and cut across in every direction and thoroughly worked with spades, sufficient water being added and the whole mass reduced to a stiff homogeneous consistency. It should then be rammed into position in very thin layers.

Wood is used in roof trusses, and in the construction of floors, doors, &c., in various parts of the work. It is also used for pile foundations. Oak, beech, and elm are the best suited for the latter purposes.

Innumerable tables have been published giving the relative strength of various materials to support loads. These strengths should never be approached in actual practice, and large margins should be allowed in designing structures from them. The following table of "Factors of Safety" is given in Unwin's "Machine Design."

#### Factors of Safety for—

	DEAD LOAD.	LIVE LOAD.
	In temporary structures.	In permanent structures.
Wrought-iron .....	3	4 to 5
Cast-iron .....	3	4
Timber .....	4	10
Brickwork .....	—	6
Masonry .....	20	20 to 30

In the last number of "Student's Column" there was a mistake in formula 3 (page 193, foot of second column), through the substitution of a + sign for ×. It should read:—

$$G = \sqrt{\frac{(3d)^3 \times h}{l} \cdot \frac{r^4 l}{1.394d + r^4 l}}$$

#### OBITUARY.

DR. HEINRICH BRUGSCH.—We have to record the death of the well-known Egyptologist and archaeologist Dr. Heinrich Brugsch Pacha, after a long and severe illness. Dr. Brugsch first visited Egypt in 1859, where he lived for some time in the desert with Mariette Bey, the illustrious French explorer of Memphis fame. In 1857 he again visited Egypt, and undertook an archaeological expedition up the Nile in conjunction with Mariette. Two years later he, in consequence of his knowledge of Persian, was attached to the first Prussian mission to Persia, and on the death of the resident Minister, Herr von Minntoli, was appointed his successor. On his return, in 1861, he wrote his work, "The Journey of a Prussian Mission in Persia." From 1864 to 1868 he acted as Prussian Consul at Cairo, and, after a short interval spent as Professor at Göttingen University, he returned to Egypt at the invitation of the Viceroy, Ismael Pacha, to found a European Oriental school for the deciphering of hieroglyphics. At the opening of the Suez Canal in 1869 he was brought into contact with a number of distinguished personages, some of whom he subsequently accom-



panied on tours through Egypt, and thereby gained various distinctions.

At a later period he accompanied the Crown Prince Rudolph and Prince Frederick Charles of Prussia. In 1884 he was appointed interpreter to the German Mission to Persia, and on his return was decorated with the Crown Order. Since that time he has lived at Berlin, where his lectures and writings were distinguished as much by clear insight and scholarship as by an easily comprehensible and popular style.

PROFESSOR FARETTI, the well-known Italian archaeologist, died on the 16th inst. After the Revolution he was forced into exile at Turin, where he became director of the Museum of Antiquities, and Professor of Archaeology at the University. He was appointed a Senator in 1889.

#### GENERAL BUILDING NEWS.

**PENISTONE (YORKSHIRE).**—The Sheffield Union Banking Company are engaged in the erection of a range of new premises on a site in the old market-place which was formerly occupied by the old Penistone Grammar School, erected in 1397. The Grammar School has been removed to Weirfield, a large house having been purchased and made into a school. The new buildings in the Market-place include a post-office, which will take the place of the present office, now housed in a building erected in 1793 as a cloth hall or shambles, at a cost of 800*l.*, by the Wordsworth family, who for generations resided at Water Hall, near Penistone, where William Wordsworth, the poet, was born in 1776. In addition to the post-office, the new buildings will accommodate the Sheffield Union Banking Company, and will also provide other business premises. The work is being carried out by Messrs. Hawley Bros., of Penistone, from designs by Mr. J. D. Webster, of Sheffield.

**CITY OF LONDON SCHOOL FOR GIRLS, CARMELITE-STREET, VICTORIA EMBANKMENT.**—On the evening of the 13th inst. the above new schools, erected by the munificence of the late Mr. Wm. Ward, of Bristol, on a site provided by the Corporation, were opened. A conversation was held on the occasion, at which Mr. Claudius C. Algar, chairman of the Law and City Courts Committee, stated that the principal hall would receive 250 girls. The school at large had 7½ ft. frontage, 5½ ft. depth, and 3,683 ft. superficial area. The new building adjoins the Guildhall School of Music. **THE NEW WESLEYAN CHURCH, LEEDS.**—On Saturday last (15th inst.) a new Wesleyan chapel was opened in Roundhay-road, Leeds, in future to be known as Trinity Chapel and Schools. The structure, according to the *Leeds Mercury*, has cost 8,300*l.*, and there has been contributed in aid of the building fund 5,036*l.*, leaving a deficiency of over 3,000*l.* The edifice is of pressed bricks, and in the Italian style of architecture. The architect is Mr. G. F. Danby. The body of the chapel is divided into four aisles. The centre seats are straight, those at the sides circular, while the choir stalls are on either side of the pulpit. The minister's vestry, a church parlour, and a ladies' workroom, are to be built hereafter between the school and the chapel. The contractors were Mr. Thomas Hannam, builder; Mr. Joseph James, joiner; Messrs. Lazenby & Co., plumbers; Mr. T. Moore, plasterer; and Messrs. J. & H. Smith, ironwork and warming.

**WESLEYAN CHURCH, CHESHIRE, MAN. HESTER.**—The memorial-stones of this church, which is being erected in the Wilton Polygon, facing Bury Old-road, Chesham Hill, were laid on the 15th inst. The edifice, designed by Messrs. William Waddington & Son, architects, of St. Ann's-square, will be Gothic in style. The spire is to be 150 ft. in height, and the main gable of the building will be flanked by octagonal buttresses terminating in pinnacles. The total cost is estimated at 11,000*l.*

**CHURCH RESTORATION, ST. GERMAN'S, CORNWALL.**—The restoration of St. German's Church has now been completed at a cost of about 6,000*l.*, and the edifice was re-opened last week. The new choir-stalls, parclose screen, and other carving works have been done by Messrs. Harry Hems & Sons, of Exeter. These are all of English oak, and into the screen much fifteenth-century Cornish wood-carving in the same material has been incorporated. The stalls have a distinct individuality and interest thrown into them by the introduction of a number of scenes in St. German's life, sculptured in high relief in the bench-ends. Messrs. St. Aubyn & Wadling, of London, are the architects under whom the works have been carried out.

**PARISH CHURCH, RUGBY.**—When the parish church at Rugby was rebuilt a few years ago the plans included a tower, spire, and vestries, but for want of funds—the other work having cost upwards of 20,000*l.*—these portions were deferred. Mr. J. C. Benn, of Rugby, has generously offered to defray the cost of completing the church, and the work, which will be carried out under the direction of the original architect, will be put in hand as soon as possible.

**NEW CHURCH, BAMBER BRIDGE, NEAR PRESTON.**—On Saturday last, the 15th inst., the Bishop of Manchester laid the memorial stone of the church to be erected in School-lane and Withy Trees, Bamber Bridge. The style adopted is Late Decorated Gothic; the building will accommodate 800 people, and the whole is estimated to cost 45,000*l.*

Mr. R. Knill Freeman, of Bolton and Manchester, is the architect.

**TECHNICAL SCHOOL BUILDINGS, BURY, LANCs.**—The Earl of Derby opened the new technical schools at Bury on Saturday last, the 15th inst. Their total cost, including the site and furnishing, is about 21,000*l.*, of which 16,000*l.* is for the actual building. The style of architecture adopted is Classic, with Renaissance ornament. The *Bury Guardian* states that the main front is entirely of dressed stone from the Cuttingworth Quarries, and consists of a central main entrance projecting from the face of the main building, and carried up to the roof with a carved central panel of stone, with figures in relief representing Art, Science, Literature, Mechanics, Electricity, &c., a centre dormer of three lights terminating with the roof. The basement rooms and ground-floor front rooms are lighted by large windows with embossed Grecian key ornament borders, over which are four stone panels of large dimensions, filled with sculpture in relief representing various manufactures, the arts and sciences, history, painting, geography, shipbuilding and various industries. The series when complete will be a study for students in carving, drawing, and modelling. Rising from the centre of the group of buildings is a large shaft or tower, the height of which is 100 ft. This shaft is divided into four flues, each flue being for a distinct purpose, viz., the exhaust of the gas or steam from the engine, one for the fumes which are aspirated by means of an electric fan-motor from the chemical laboratory combustion chambers and chemical lecture theatre, one for the heating apparatus, and one for general ventilation of the building. The whole of the roofs are covered with green Westmoreland slates. In addition to the special arrangements in the laboratory, it is also ventilated by a large and specially-designed ventilator connected to 15-in. galvanised flues, with three outlets. Under each outlet is a large sunlight to aid ventilation in certain conditions of the atmosphere. The main buildings, the chimney-stacks, &c., are of local brick faced with stone dressings. The red pressed bricks, relieved with stone dressings, the main fronts to Broad-street and Moss-lane have stone facing. The principal staircase window, consisting of thirty large lights, is filled with stained glass, with appropriate coat-of-arms and badges. In other parts of the building the doors, panels, and screens are filled with stained glass with figures and emblems relating to Science and Art. The whole of the stained glass and leaded lights have been specially designed and executed by Messrs. A. Seward & Co., of Lancaster. The lighting throughout is by electricity, on the single parallel system. All the staircases and corridors are fireproof; and the building is heated by hot water, on the low-pressure system.

The whole of the buildings, &c., were designed by the Borough Engineer, Mr. J. Cartwright, and the bulk of the work has been executed by local contractors.

**SCHOOL BUILDINGS, HALSTAD, ESSEX.**—On the 13th inst., the memorial stone of the class-rooms to be added to the new Congregational Church school buildings was laid by the Chairman of the Essex Congregational Union. The buildings are of white brick, with stone dressings; the work is being carried out by Mr. W. Sudbury, sen., of Halstead.

**HEALTH BUILDING, CONVALESCENT HOME, HILROGATE.**—The foundation-stone of a new wing to this building, which is an adjunct of the Sunderland Infirmary, was laid on Saturday last, the 15th inst. It will be three stories high, the ground floor being devoted to the admission and treatment, the wards of the present building will be continued to the new wing, leading into a lofty and spacious hall. The total cost of the extension, including the furniture and some land purchased for future addition (amounting to 1,000*l.*), is 4,500*l.* The architect is Mr. John Eltringham, of Sunderland, and the contractors, Messrs. Ives & Co., of Shipley.

**WESLEYAN CHURCH, BILTINGTON, CHESHIRE.**—Mr. T. Taliesin Rees, of Birkenhead, has been commissioned to carry out the proposed church and schools. The style will be Late Gothic, and the materials are of red pressed bricks with white local stone dressings and tracery. It is the intention of the Committee at present only to erect the school-chapel, which contains seating accommodation for 250 adults, minister's vestry, two class-rooms, kitchen, w.c.'s, lavatory, &c. The future church has been arranged to seat 600 adults, with church parlour, vestries, organ chamber, &c.

#### SANITARY AND ENGINEERING NEWS.

**SKELTON AND BROTTON SEWAGE DISPOSAL.**—A Local Government Board inquiry was held recently at the Local Board Offices, Skelton-in-Cleveland, by Mr. W. J. B. Clarke, M.Inst.C.E., Engineering Inspector. There was a large attendance, including representatives from the Salburn Local Board, who some time ago obtained an injunction at the County Court to prevent the Skelton and Brottion Local Board from polluting with sewage from their district the Skelton Beck, which flows through Salburn. The inquiry was held to obtain the sanction of the Local Government Board to borrow 174,000*l.* for works of sewerage and sewage disposal which will prevent this pollution. The scheme, which is of a

complex and difficult nature, is from the designs of Mr. D. Balfour, M.Inst.C.E., of Newcastle-on-Tyne, and comprises about ten miles of 24, 18, 15, 12, and 9-inch sanitary and iron pipes, with manholes and lamp-hole shafts, flushing chambers, and iron pipe valley crossings. The work consists of a combined intercepting scheme for conveying the whole of the sewage from the ten villages comprised in the Board's district to a point at the top of cliffs on the coast, where the cliffs, 200 ft. in height, will be bored and lined with iron pipes having cast-iron joints at the bottom of iron pipes having cast-iron joints at the top, and then by means of cast-iron pipes laid in a cutting in the rock of which the beach is composed, the sewage will be delivered at lowest point of the furthest ebbing tide. The scheme was explained, and other evidence given by Mr. Balfour, on behalf of the engineer, after which the inspector visited the whole of the district.

**WATER SUPPLY AND SEWERAGE, BEDFORDSHIRE.**—The Local Board had the water scheme under consideration at its meeting on the 13th inst., when a communication from the Local Government Board was read to the effect that the department had decided to comply with the Local Board's application for sanction of a loan of 2,000*l.* for waterworks, for sanitation of the town, the sum of 97*l.* required for cleaning out the present filter-bed and for repairing walls, which should be paid out of the current rates. With reference to the application for a loan of 600*l.* for sewerage works, the Local Board was requested to take steps to acquire land upon which the sewage may be purified before it passes into the streams, which are fed by the river Rhyth, and when this has been done a revised estimate should be sent in. A local committee was appointed to consider the matter.

**STAMFORD DRAINAGE.**—The Town Council of Stamford met on Monday last (17th inst.) to consider a report upon the drainage and water supply of the town, prepared by Mr. R. H. Bicknell, C.E., of the town. He reported that the cost of excavation would be somewhat high, owing to the drains having to be laid for the most part in rock. A system of ventilation by means of manholes, or lamp-holes, if provided, and he proposes to construct five large arteries, or storm-water mains, which will take in the whole of the storm-water, utilising, as far as possible, the existing drains for that purpose. He recommended the adoption of the International system of purification at the outfall works. With regard to the water supply, Mr. Bicknell says there is an abundance of water in the neighbourhood, which, however, is at present only partially used. He estimates the cost of carrying out his drainage scheme at 30,000*l.*

**KNOTTS HOSPITAL, &c., EAST GRINSTEAD.**—At the last meeting of the East Grinstead Local Board a resolution was passed to apply to the Local Government Board for sanction to borrow 3,500*l.* to build an Infectious Hospital, according to plans prepared by Mr. Wm. Willis Gale, and the surveyor, and also for 500*l.* for works of permanent improvement on the main road.

**WATER SUPPLY OF LIVERPOOL: NEW AQUEDUCT OPENED.**—On Tuesday last (18th inst.), the Lord Mayor of Liverpool formally turned on the valve of a Kensington reservoir permitting a direct supply from Wyrnwy Lake through the new aqueduct to be completed between the city and the Prescot reservoir. In the course of a somewhat lengthy report, the *Liverpool Daily Post* remarks that the new main, just completed from Prescot has been laid in accordance with a recommendation of the water engineers approved by the Council on April 5, 1893. The aqueduct consists from Prescot to Knotty Ash of cast-iron pipes 3 ft. 4 in. internal diameter and, with the exception of two short lengths of steel tube, the exception of 2½ ft. diameter from Knotty Ash to the Kensington Reservoir, Liverpool. The Cheshire Lines Railway at Knotty Ash and the London and North-Western Railway at Stanley are crossed by means of riveted steel tubes of the same diameter as the cast-iron pipes. The aqueduct commences by a junction with the Wyrnwy pipes where they cross the Eccleston road at a distance of 242 yds. from the inlet of the Prescot reservoir. There is also a junction in the same road with the Rivington aqueduct, and these junctions are arranged that water can be turned into the new main either from Wyrnwy or Rivington direct. At Eaton-road, West Derby, the main pipes terminate, and a branch main of 2-ft. internal diameter is taken off to convey water to the intended reservoir at Breeze Hill, Walton. The latter main has also been completed, with the exception of crossing the Cheshire Lines Railway at West Derby Station. Past the point of junction the 40-in. pipes are reduced to 36 in., and this diameter is maintained along the Prescot-road to the Kensington reservoir. The total length of the new pipe line between the Kensington and Rivington is nearly 7½ miles. The principal feature and object of these mains is to convey water to the City and to Bootle the full quantity water which the present Wyrnwy pipes are capable of conveying. The quantities conveyed in ordinary work will be about 10,000,000 gals. per day in Kensington, and 6,000,000 gals. per day into Bootle Hill. The whole of the cast-iron pipes employed have been supplied by the Staveley Coal and Iron Co. Limited, whilst the steel tubes crossing the Cheshire Lines Railway at Knotty Ash were made by Messrs.



Fawcett, Preston, & Co., of Liverpool, and the steel tube crossing the Stanley Bridge of the London and North-Western Railway by Messrs. D. Rollo & Sons, Liverpool. The total expenditure on the main from the Treasury has been 63,000*l.*, but the estimate cost 35,000*l.*; distributing mains from Breze Hill Reservoir, estimated cost 5,000*l.*; new high-pressure engine at Aubrey-street, with necessary pumps and boilers and connexions to present high-level tank; estimated cost 10,000*l.*.

**WATER SUPPLY OF ATHERSTONE.**—The Local Government Board, before sanctioning the scheme of the Atherton Guardians involving the borrowing of 11,421*l.* for water supply works for the parishes of Baddesley, Ensor, Baxterley, Bentley, and Merevale, wished to know whether the attention of the Authority's Surveyor had been drawn to (1) the spring at Wheatley's Wood (2) the Merevale spout, and (3) the water pumped from the colliery at Speedwell shaft, as possible sources of supply.—The Surveyor presented a reply at a meeting of the Guardians on the 18th inst., in which he stated that the supply at Wheatley's Wood was insufficient; that the Merevale spout ceased to flow on the 7th inst.; and that the water pumped from the Speedwell shaft could not be considered a supply for domestic purposes, as it came out of the Coal Measures.

**SEWERAGE SCHEME, STAFFORD.**—A special meeting of the Stafford Town Council was held on Tuesday, the 18th inst., to consider a report from the sewerage committee with respect to the proposed drainage scheme, at which it was mentioned that the Local Government Board would arrange to hold a public inquiry on the matter. The committee recommended that a contract be entered into with Mr. E. Tempest, of Manchester, upon his tendered schedule of prices worked out to a total of 21,300*l.*, and that the Backwells North section of the proposed work be proceeded with at once, and the other sections continued as soon as the Local Government Board's sanction had been obtained, the contract being subject to any variations required by the Local Government Board. After some discussion the report was adopted.

**KINGSBURY (TAMWORTH) WATER SUPPLY SCHEME.**—At a meeting of the Tamworth Rural Sanitary Authority, held last Saturday, a letter was read from the Local Government Board with reference to the inquiry held in October last, into an application for sanction to a loan of 75,000*l.* for establishing water-supply works at Kingsbury, to the effect that the board had again considered the circumstances and were advised that the chief objection to the scheme proposed by the authority was the risk of subsidence in consequence of mining operations, by which the supply of water to the well might at any time be diverted and lost. The board understood that such loss of water had actually occurred in the neighbourhood, and, moreover, that nearly the whole of the parish of Kingsbury had been underlain with coal, for the extraction of which fresh workings were said to be imminent. The board could not fail to recognise that the adoption of the proposed scheme must involve considerable risk of loss of public money by the failure of the works. It, however, in view of that risk, the authority still considered it desirable to carry out the scheme, and the board accordingly resolved to prepare to sanction a loan for the execution of the scheme when it had been amended. The board, however, still considered that it would have been preferable for the parish to have been supplied with water by the Tamworth District Waterworks Committee.

## FOREIGN AND COLONIAL.

**FRANCE.**—M. Caniez, the sculptor, has just finished the colossal stone statue of "Grand Condé," which was commissioned by the State for the decoration of the grand staircase of the Ecole Supérieure at Geneva. The Government has commissioned M. Loiseau Bailly, sculptor, to execute a marble bust of Gambetta, for the military school at Saint-Maixent.—An interesting Museum has been arranged at Nîmes, consisting of inscribed stones belonging to the first four centuries of the Christian era. Until this time they have been thrown pell-mell into the earth, beneath a great deal of debris of pagan statues and architecture, which are so common in the south of France.—Very shortly a breakwater is to be made in the Gulf of Juan. The cost is estimated at 300,000 francs. In the Port of Guineville (Finistère), another breakwater is to be built at a cost of 100,000 francs. There is a scheme for draining the lake of Grandlieu (Loire Inférieure) for agricultural purposes. The lake measures nine kilometres from North to South, and seven kilometres from East to West. It will cost two million francs.—A maritime laboratory has just been finished at Saint-Vast la Hougue.—At Beaulieu in the Department of Correz, the bronze statue of General Marbot is shortly to be inaugurated. It is the work of M.

Millot of Marcilly, who exhibited it this year in the Champs Elysées Salon.—A few days ago a fire took place at the Hotel de Ville at Verdun, and has almost entirely destroyed the museum in one part of the palace. It contained some interesting sculpture of the Middle Ages, and also some fine pictures ancient and modern, amongst them Bastien Lepage's "Chanson du Printemps."—The Departments of Gard and Vaucluse have built, by the help of the State, a "sanatorium" for very young children, in the Valley of Peyrabout near Alzon (Gard).—It is said that a new church of Sainte-Anne is to be built at Colonne Raudon (Algeria).—There has just been a solemn inauguration at Puy (Haute Loire) of the fountains of Saint Paulieu.—MM. Mercié and Falguère, the sculptors, have just finished the model for the monument which the town of Toulouse is to raise to the memory of the poet Gondouin. The model is exhibited in the museum at Toulouse.

**GERMANY.**—The Berlin Art Exhibition was closed on Sunday last.—The new locks on the Mühlen-damm were tried for the first time last week; the gates are all worked by hydraulic pressure.—A proposal to have a reproduction of "Old Berlin" in the time of the Electors at the 1895 Industrial Exhibition has been referred to the Berlin Historical Society. With a view to the Exhibition the railway authorities are about to build a new station at Treptow.—Two fountains are to be erected on the Schillerplatz at Berlin at a cost of 500*l.*—The sub-committee of the Municipality appointed to consider Messrs. Siemens' proposals as to the Berlin Overhead Metropolitan Electric Railway, has reported in favour of granting the concession for twenty years, subject to a payment of 2 per cent. on the annual gross receipts, and the latter exceed six million marks, when the rate is to rise a quarter per cent, with every additional million marks gained.—The three Prussian Freemasons' Grand Lodges have voted 1,000*l.* towards painted windows in the Emperor William I. and Frederick Memorial Chapels. The sculptor, Josef Drischler, has been successful in a competition for a large statue of the Archangel Michael for the latter edifice.—It is announced from Crefeld that negotiations are taking place between the Chamber of Commerce of that city and the Belgian authorities, with a view to furthering the plan of a direct canal between Antwerp and the Rhine, *via* Crefeld.

## MISCELLANEOUS.

**NATIONAL MONUMENTS IN IRELAND.**—According to the recently-issued report of the Irish Commissioners of Public Works for the year ending March 31, 1894, the amount spent by them on national monuments during that period was 1,421*l.* 10*s.* 7*d.*, of which 461*l.* 8*s.* 7*d.* was expended for maintenance, and 959*l.* 13*s.* 6*d.* for restoration works. The largest part of the latter sum, 319*l.* 11*s.* 5*d.*, was expended on the Abbey of Knockmoy, Galway, which was in a most dilapidated condition, the nave and chancel being crowded with debris. The upper portion of their walls and the conventual buildings were nearly falling. All that was necessary to maintain the Abbey in a proper state of repair had been done, and a caretaker appointed. At Kilmallock Abbey, Limerick, the expenditure was 171*l.* 13*s.* 4*d.*. Owing to difficulties experienced as to the vesting of the Abbey little was done beyond preparing drawings, and carrying on preliminary work connected with the general survey. At Sherkin Island Abbey, Cork, an extensive ruin in a most dilapidated condition, 109*l.* 10*s.* 9*d.* was expended. Many of the walls were in a most dangerous state, and care had to be taken not to make matters more serious during the repairs, which were carried out satisfactorily. At Ennis Abbey, Clare, the expenditure was 93*l.* 4*s.* 4*d.*. The Abbey had been used as a parish church, having been roofed in in 1870. All the woodwork of that date was ruinous, and had to be removed. The nave was excavated to its original level; arches which had been blocked in 1870 were reopened; and the usual repairs to walls effected. At Innisfallen Island, Killarney, where the ruins comprise an oratory, the ancient abbey, and surrounding conventual buildings, the expenditure was 161*l.* 10*s.* 9*d.*. The date of the oratory is twelfth century; portions of the abbey the same, part of it thirteenth, and part sixteenth century. The oratory has been repaired and falling walls secured. The debris filling the interior has been removed, disclosing many curious and interesting tombs. The eastern gable, with two Early English windows, counterparts of those at Agadho, in the vicinity of Killarney, had fallen, but the windows were perfect, and have been replaced in their original positions. The high altar was discovered, and beneath it a curious relic, half bird, half fish, partly bronze and partly ivory. This relic has exercised the minds of learned societies, but no definite conclusion has been arrived at. Some further work is requisite on outlying portions of the conventual buildings, which it is hoped may be done this year. At Ballin-shegga, Kesh, are extensive ruins, having little architectural detail of importance, but an interesting history. Repairs were carefully carried out under an experienced clerk of works, at a cost of 72*l.* 16*s.* 1*d.*. The expenditure on Glendalough Church, Wicklow—421*l.* 12*s.* 2*d.*—was for repairs to the roof of St. Kevin's kitchen, painting, &c., re-

building a portion of the gable of St. Mary's church; the construction of a new bridge over the river, the former one having become dangerous through decay; cataloguing and fixing labels on the various fragments found from time to time, and stored in St. Kevin's kitchen. No other work was required. Owing to the careful way in which former repairs were done on the Quin Abbey, Clare, little remains to be carried out. The work mainly in connexion with the Dunboyne vault cost 381*l.* 19*s.* 8*d.*. At Melifont Abbey, Louth, the work done at a cost of 241*l.* 1*s.*, consisted in repairs to portions of the walls which had fallen into disrepair since the last repair. At Monasterboice, Louth, the cutting of ivy and the under-pinning of walls undermined by the digging of graves was all the work necessary, at an expenditure of 15*l.* 17*s.* At Athenry Abbey, Galway, extensive repairs were necessary. The walls required repair and pointing. The debris collected in the interior was removed. The fine tomb of the Bemingshams was repaired, and all that was required to maintain the building done. The cost of these repairs is given at 34*l.* 3*s.* 6*d.*, evidently an error, though the work in other cases seems to have been done at a marvellously cheap rate.

**MANCHESTER TECHNICAL AND ART SCHOOLS.**—We have received the syllabus for 1894-5 of the Municipal Technical School and Municipal School of Art at Manchester, giving a statement of the very extensive and varied educational work carried on in these schools. In the Art Schools the subjects include:—Geometry; Perspective; Freehand and Model Drawing; Architectural Drawing and Colouring; Drawing and Shading in Chalk, or with the Pen, or with Brush; Painting in Oil, Water Colour, Tempera, &c., from Casts of Decorative Art, Landscapes, Animals, and the Living Model, &c.; Memory Studies; Anatomical Drawing; Modelling in Clay, Plaster, and Gesso; Analysis of Ornament and of Plant Forms for Decorative Purposes; Designing for Manufactures and Decoration; Figure and Landscape Composition. Day and Evening Classes in Wood-Carving are held in the Technical School. Mr. Glazier is the lecturer on Architecture and Historic Ornament. Mr. Walter Crane is to give ten illustrated lectures on "The Basis of Design and Influences which Determine its Character."

**NEW RAILWAY IN ABERDEENSHIRE.**—On Saturday, 8th inst., the first turf cut of the new Cruden Railway, to run from Ellon to Boddam, a fishing village on the Aberdeenshire coast, near the town of Peterhead. The new line is 13½ miles in length, and the Boddam terminus is near Stirling-hill, where there are many granite quarries. Most of the quarries at Stirlinghill and Blackhill belong to firms in Aberdeen, and at present it is calculated that over 12,000 tons of granite is annually carted from these quarries to Peterhead and thence transmitted by rail to Aberdeen. The quarry-owners will be able by the new branch to send direct to Aberdeen not only blocks for building and monumental purposes, but large quantities of small stones (hitherto thrown into the sea) to be utilised for causewaying. The new line will accommodate an agricultural district as well as the fishing industry at Port Erroll, Longhaven, and Boddam; and the rock scenery of the coast is bold and picturesque. Mr. P. M. Barnett, C.E., Aberdeen, is chief engineer for the new line, which is being constructed by the Great North of Scotland Railway Company. The contractors for the earthwork and masonry on the new route are Messrs. Charles Brand & Son, Glasgow, and the ironwork of the bridges is divided between Messrs. Jas. Abernethy & Co., Ferryhill Road, Aberdeen, and the Cleveland Bridge and Engineering Works, Darlington. The line will be ready for traffic in the summer of 1896.

**A VENTILATING AND WARMING CODE.**—We have received from Mr. R. W. Boyd a useful card of thirty suggestions in regard to warming and ventilating churches, chapels, and large rooms. They are very good, and some of them very pitifully expressed; the card is a good one to hang up in a vestry or lobby of a church as a caution and guide to the officials and churchwardens. The only point we demur to is the recommendation that several small outlets are better than one large one. Can we be sure that they will all act as outlets?

**KING'S COLLEGE.**—We have received the syllabus of lectures and classes in architecture at King's College, under the direction of Professor Banister Fletcher. The lectures will comprise the subjects in which candidates are examined at the Institute of Architects' examinations for Building Surveyor; the subjects in which candidates are examined at Carpenters' Hall in June in each year; and the subjects required in the examinations at the City and Guilds Institute and the Science and Art Department. All students have the advantage of borrowing books from the Architectural Reference and Lending Library.

**WATERFORD AND SOUTH-EAST OF IRELAND ARCHAEOLOGICAL SOCIETY.**—Last week the Society made an excursion by steamer to Dunbrody Abbey, where a paper upon the Abbey and its history was read by the Rev. P. Power, F.R.S.A., who was thanked on behalf of his auditors by Dr. Sheehan, Bishop of Waterford and Lismore.

**RECREATION-GROUND, SOUTHPORT.**—A Local Government Board Inspector held an inquiry at Southport on the 13th inst. with reference to an application by the Corporation of that city for



## CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	To be delivered.
Real Materials . . . . .	See also Schedule B	B. A. Miller . . . . .	Oct 1
Prints and Drawings, &c. of Sewer Works.	Alcock & Canongate	Official . . . . .	do.
Manholes . . . . .	See also Schedule B		

[illegible]

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Assistant in Building Branch (Works)	London C. C. ....	209l. ....	Sept. 27
*Architect. ....	London C. C. Asylums Committee	800l. ....	Oct. 1

At Coventry Police Court on Monday, George Blakeman, builder, of Cope-street, Coventry, was summoned on three informations for breaches of the building bye-laws. Mr. G. Beard, Town Clerk, prosecuted, and Mr. S. R. Masser, solicitor, defended. The Town Clerk said that plans were forwarded by the defendant to the General Works Committee of two houses to be erected in Queen's-road, Coventry. The plans were returned to the defendant's architect for alteration by the omission of a certain room shown on the original plan. The amendment was agreed to by the committee, but the houses being erected after completion, was found to be in breach of the bye-law. The house was found to be high, and that there was no fireplace or special means of ventilation. A certificate of completion was not granted, and the General Works Committee instructed the City Surveyor to take proceedings. The house had since been sold, and was now

12, III.—HINGE JOINTS: Z. Leglay.—An improved hinge which can be regulated at will, containing an oil chamber into which dust cannot enter. The construction





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New Premises.	Fittings and Alterations.	Total.
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Higgs & Hill. ....	4 10	18 0
Malloy Bros. ....	11 0	5 5
Fairman & Forthright. ....	11 0	3 5
Lasselles & Co. ....	11 0	4 0
Clarke & Bracey. ....	11 0	4 0
Colls & Co. ....	11 0	4 0
W. Johnson & Co. ....	11 0	4 0
Turnham & Sons. ....	11 0	4 0
Turtle & Keppleton. ....	11 0	4 0

LONDON.—For alterations to premises, Berners-street, W. Messrs. Bennett & Jackson, architects. Mr. Geo. Parker, Peckham, S.E. J. Smith & Sons. .... Accepted.

LONDON.—Accepted for the erection of two residences, Peter-street, Chelsea, S.W. Mr. J. Stevenson, architect, London. Quantities by Mr. W. H. Elmore, Barnes. .... Accepted.

LONDON.—For alterations to the Britannia public-house, Kingsland Road, Mr. George Carter, architect, London. .... Accepted.

LONDON.—For alterations to Nos. 192 and 193 Upper-street, Islington, for Mr. W. L. Lewis. Mr. Edmund J. Harrison, architect, London. .... Accepted.

LONDON.—For alterations to Nos. 192 and 193 Upper-street, Islington, for Mr. W. L. Lewis. Mr. Edmund J. Harrison, architect, London. .... Accepted.

PENRHYNWIC (Wales).—For the erection of a villa, Rhyl terrace, for Mr. E. E. Jones. Mr. E. E. Jones, architect, Penrhyn. .... Accepted.

POOLE.—For the execution of sewage works, for the Urban Sanitary Authority. Mr. John Elford, Borough Engineer, Poole. .... Accepted.

Contractors.	Contractors.	Contractors.
F. Rees, Lymington. ....	£13 10	0
Hill & Co., London. ....	14 0	0
W. H. Saunders & Co. ....	14 0	0
A. Rutter & Co., Barry. ....	14 0	0
W. Hoare. ....	14 0	0
C. Troke. ....	14 0	0
Jas. Dickson. ....	14 0	0
T. Whittam. ....	14 0	0
S. Minty. ....	14 0	0
George Usinton. ....	14 0	0
John Neave. ....	14 0	0
H. Cooke & Son. ....	14 0	0
T. C. Rigler. ....	14 0	0
John Jackson. ....	14 0	0
Cochrane & Son. ....	14 0	0
Dorset Iron Foundry Co. ....	14 0	0
Worthing & Son. ....	14 0	0
J. Mowlem & Co. ....	14 0	0

PORTSMOUTH.—For the construction of a road, footpath, and main sewer, from the Port of Portsmouth to the Port of Portsmouth, for the Urban Sanitary Authority. Mr. John Elford, Borough Engineer, Portsmouth. .... Accepted.

PUDSEY (York).—For the execution of sewerage works, Contract No. 21 for the Local Board. Mr. Cass, Surveyor, Market-place, Pudsey. .... Accepted.

RICKMANSWORTH.—For the erection of a detached villa residence, for Mr. T. E. N. Mr. Edmund J. Harrison, architect, London. .... Accepted.

ST. THOMAS (South).—For the construction of two sewers, for the Urban Sanitary Authority. Mr. John Elford, Borough Engineer, St. Thomas. .... Accepted.

ST. THOMAS (South).—For the construction of two sewers, for the Urban Sanitary Authority. Mr. John Elford, Borough Engineer, St. Thomas. .... Accepted.

STAINLAND (York).—For the erection of a new house, for the Local Board. Mr. T. E. N. Mr. Edmund J. Harrison, architect, London. .... Accepted.

ST. ALBANS.—For the construction of a new house, for the Local Board. Mr. T. E. N. Mr. Edmund J. Harrison, architect, London. .... Accepted.

SWINDON.—For alterations to the "Bell and Shoulder of Mutton" Inn, Marlborough Road. Mr. W. H. Read, architect, Swindon. .... Accepted.

TUNBRIDGE.—For the construction of a new house, for the Local Board. Mr. T. E. N. Mr. Edmund J. Harrison, architect, London. .... Accepted.

WIMBORNE (Dorset).—For alterations to four cottages, Brydon & Son, London. .... Accepted.

WORTHING.—Accepted for inside fittings, &c., of No. 9, South-street, for the Sussex Co-operative Dairy Company, Limited. H. G. Fisher, Judd-street, W.C. .... Accepted.

#### TO CORRESPONDENTS.

WE are sorry to hear that some of our correspondents have been unable to send us their contributions. We are compelled to decline pointing out books and giving addresses. NOTE.—The responsibility of signed articles and papers read at public meetings, rests of course with the authors. Letters or communications by post, unless accompanied by a note, which have been published for other journals are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR, those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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## ILLUSTRATIONS.

Marble Staircase, Glasgow Municipal Buildings.—Mr. W. Young, F.R.I.B.A., Architect.....	Extra Large Ink-Photo.
House at Hamble, for the Hon. Alic Yorke: Entrance and Garden Fronts.—Mr. R. A. Briggs, Architect.....	Double-Page Ink-Photo.
Municipal Buildings, &c., Rotherham.—Mr. R. J. Lovell, Architect.....	Single-Page Photo-Litho.
A Portion of the New School Buildings, Tonbridge, Kent.—Mr. W. Campbell Jones, A.R.I.B.A., Architect.....	Single-Page Photo-Litho.

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## The New London Building Act.



THE code of regulations which has been the subject of so much animated and expensive discussion has now passed out of its transitory stage as "The London Streets and Buildings Bill" and received the Royal Assent under its permanent title, "The London Building Act, 1894," under which title it comes into operation on January 1, 1895, and will probably be for many years the controlling document for the regulation of building operations in the County of London. It becomes, therefore, a matter of considerable interest to most of our readers to consider what will be its practical effect in its final form, and how far the conditions of London building will be modified on and after January 1, 1895.

One of the best points about the new Act is that it is prefaced by a long array of "definitions." In the existing legislation definitions are few and not properly grouped; and lack of definitions is a fruitful cause of misunderstandings and disappointments. Of the subjects which are already defined under the existing law the following, viz., "Public Building," "External Wall," "Cross Wall," "Party Structure," remain the same in effect as at present, with some non-essential changes of expression. The definition of "Party-Wall" is essentially the same as at present, but it is rendered more precise in wording by making the sentence as to "different owners" a separate sub-clause in which the party-wall is defined as a wall "standing to a greater extent than the projection of the footing on lands of different owners," a detail which removes a possible ground of misunderstanding. The expressions "owner" and "building owner" retain their old definitions, but to that of "builder" we find the significant addition that where no person is employed in the usual capacity of a builder it shall mean "the owner of the building or structure"; an effectual stoppage of one loophole of evasion. "Street," which has only previously been defined in a by-law, here receives a definition which includes "road," "bridge," "lane," "mews," "footway," "square," "court," "alley," "passage," "whether a thoroughfare or not" (as at present); it may be noted

that the word "mews" is an innovation in the definition. The term "way" includes such footpaths or passages as are not included in the preceding very comprehensive definition. The more important point to our readers is the "centre of the roadway," which with the "prescribed distance" (from the centre), retains in the main the same definitions as before, including that which provides that in the case of a street laid out after August 18, 1890, the superintending architect may define the line constituting the centre of the roadway, and this shall remain the legal centre even in case of the future widening of the street, which would leave the line out of the actual centre. There may be some purpose of simplification of working supposed to be served by this arrangement, but we confess we cannot conjecture what it is; and since the widening of any street would necessarily operate to relax, not restrict, any provisions as to distance of buildings from the centre, it will probably appear to most persons that it would have been an improvement to let the legal and geometrical centre coincide.

The term "site," which is defined in the Act of 1878, is not included among the definitions of the new Act. "Foundations," on the other hand, which in the 1878 Act was most inadequately defined as "the space immediately beneath the footings of a wall," is in the new Act much more precisely defined as "the solid ground or artificially-formed support on which the footings of the wall rest," and the word is further extended to mean "the bressummer" in the case of a wall carried by a bressummer, which appears a logical extension of the meaning; the "foundation" is whatever supports the base of the wall. The expression "base" applied to a wall is similarly extended to mean either the underside of the course above the footings, or the underside of the course laid on a bressummer. In the definition of "area" there is an important omission to be noted. Under the existing law the area of a building is "the superficies of a horizontal section of such building made at the point of its greatest surface, including the external walls and such portion of the party walls as belong to the building, but excluding any attached building the height of which does not exceed the height of the ground storey." In the new Act the sentence in italics is excluded, the previous portion of the definition remaining the same. The alteration appears a perfectly sensible one, considering that in some cases the attached building not higher than the

ground story may be an important adjunct—a large billiard-room for instance; and in fact there seems no adequate reason for the omitted sentence at all; but its omission is an important modification in the mode of estimating the "area."

On the rest of the definitions a few further notes may be made. A "new building" (a very important point in regard to the working of the Act) is briefly and clearly defined as either "any building erected after the commencement of this Act" (*i.e.*, after January 1, 1895), or "any building which has been taken down for more than half its cubical extent and re-erected, or commenced to be re-erected, wholly or partially on the same site after the commencement of this Act." In regard to this it will be seen that the alteration in the definition of "area" becomes important, and is in favour of the building-owner, as otherwise the authorities might have a claim not to reckon into the cubical contents the portions at present not included in the "area." This clause is one which has been stigmatised as oppressive, but not in our opinion justly. To pull down as much as half of a large building, and claim to re-erect it independently of the new Act, on the ground that it was "not a new building," might lead to the driving of a very large coach through the provisions of the Act; the clause is a wise and necessary one. "Bressummer" is now to be recognised in words, as it is tacitly already, as a wooden beam "or a metallic girder" carrying a wall. The expression "level of the ground," which in the working of some portions of the Act has a very important bearing, is the level of the ground as determined by the District Surveyor, or, in the event of disagreement, by the superintending architect or the Tribunal of Appeal. By clause 41 *f* (in the Section on "Open Spaces and Height of Buildings") we find that the District Surveyor will be bound to take the mean level (along the front of the building) as the level of the ground, in cases connected with the height of buildings. The terms "basement storey," "ground storey," "first storey," and "topmost storey" are sufficiently defined in a relative sense, and it will be important for speculating builders, who are much given to evasions as to the number of stories in their houses, to note that the topmost story is a

\* The new Act adopts the spelling "storey," which may be defensible on philological grounds, though there is much more precedent for "story." It has the advantage, certainly, of avoiding confusion with another word of a different meaning.

story "whether constructed wholly or partly in the roof or not." There is, however, no definition of a "storey" in itself, which was certainly required. We learn from the first schedule appended to the Act (of which more anon) that the height of a story is to be measured "from the level of the underside of the floor joists of the storey to the underside of the floor joists of the storey next above it," which gives us by implication the definition of a story; but "storey" should certainly have been included among the definitions; it is a word open to considerable latitude of interpretation, and in the existing Act it is stated that the height of a story is "the clear height exclusive of the thickness of the floor;" now we are to measure the height from the underside of the floor; and this important change is all the more reason for a direct definition.

"Party Fence-walls" are defined as now, but it is to be observed that they are no longer "exempt." "Party arches" are specially defined, being little more than the repetition of the definition of "party-wall," with the word "arch" substituted, so as to nullify any possible plea that an "arch" was not a "wall." The expression "height" in the measurement of buildings is defined as before. The "cubical extent" of a building, which becomes important in regard to the above-named definition of "new buildings," is defined as "the space contained within the external surfaces of its walls and roof, and the upper surface of its lowest storey," thus contradicting the received mode of estimating cubical contents, from the bottom of the footings.

"Fire-resisting materials" are defined by reference to the second schedule of the Act, which, as it is not long, we may give here:—

"The following materials shall for the purposes of this Act be deemed to be fire-resisting materials:—

1. Brickwork constructed of good bricks well burnt hard and sound properly bonded and solidly put together;—
  - a. With good mortar compounded of good lime and sharp clean sand hard clean broken brick broken flint grit or slag; or
  - A. With good cement; or
  - c. With cement mixed with sharp clean sand hard clean broken brick broken flint grit or slag;
2. Granite and other stone suitable for building purposes by reason of its solidity and durability;
3. Iron steel and copper;
4. Oak and teak and other hard timber when used for beams or posts or in combination with iron the timber and the iron (if any) being protected by plastering in cement or other incombustible or non-conducting external coating;
 

In the case of doors:—

Oak or teak or other hard timber not less than 2 in. thick;

In the case of staircases:—

Oak or teak or other hard timber with treads strings and risers not less than 2 in. thick
5. Slate tiles brick and terra-cotta when used for coverings or corbels;
6. Flagstones when used for floors over arches but not exposed on the underside and not supported at the ends only;
7. Concrete composed of broken brick stone chippings or ballast and lime cement or calcined gypsum when used for filling in between joists of floors;
8. Any material from time to time approved by the Council as fire-resisting."

The closing sentence leaves it open to the Council to sanction any new material which may be proved to be fire-resisting, and quite rightly; in fact, the question of fire-resisting materials is more properly a subject for by-laws than for an Act. The admission of oak and teak into the catalogue, in certain minimum thicknesses, is an important step. But there is some confusion of method and principle in the Act as to this question of fire-resisting materials. The word "incombustible" is used several times in the Act, and it is not very clear whether or not we are to regard "incombustible" and "fire-resisting" as convertible terms. This should certainly have been plainly stated; and if this were not intended there should

have been another schedule of substances accepted as "incombustible." In the body of the Act there is obvious confusion on this point, for in clause 74 (2), where provision is made for the separation in certain classes of buildings of the dwelling portion from the trade portion, it is allowed that there may be openings "fitted with fire-resisting doors." This would allow of oak doors of not less than two inches thick, but under 77 (b), "rules as to uniting buildings," doorways in party-walls must have wrought-iron doors; yet the iron and oak doors are grouped together in the schedule as "fire-resisting." Then again, the schedule includes "granite or other stone suitable for building purposes," substances which are incombustible but are certainly not "fire-resisting." Yet clause 68, as to stairs in public buildings, merely specifies them to be "fire-resisting," and therefore according to the new Act people may still go on building stone stairs as fire-proof stairs, though it has long been recognised that stone is one of the worst materials for the purpose. This is a decided oversight, and though no good architect would follow the Act in this respect, the wording of it leaves the official authority no power to condemn a stone staircase. On the other hand it should be noted that an architect can now build oak stairs in a public building without infringement of the law.

Lastly we have certain important definitions as to classes of rooms and buildings. A "habitable room" is now distinctly defined. It is a room "constructed or adapted to be inhabited," and "inhabited" means a room in which some person passes the night, or which is used as a living-room, including a room (probably this means in connexion with a room) in which it is presumed that some one passes the night. This is perhaps the most convenient method of arriving at a definition, though on sanitary grounds the restrictions as to "inhabited" rooms ought to apply almost equally to those in which people habitually pass the whole of their working hours, even when not sleeping there. The difficulty would be, of course, to settle on any logical ground what precise number of hours of occupation were sufficient to constitute an "inhabited" room. As it is, the line is drawn between sleeping and not sleeping in a room, and no doubt the distinction is an important one. As to classes of buildings, a "domestic building" is defined as at present, in negative terms, as one not belonging either to the "public building" or "warehouse" class. Public buildings are defined as at present, but with the addition of "public place of assembly," which includes any building in which people are to meet in large numbers for any purpose besides those directly specified; and there is the further important addition of

"Any building constructed or adapted to be used as an hotel lodging-house home refuge or shelter where such building extends to more than two hundred and fifty thousand cubic feet or has sleeping accommodation for more than one hundred persons."

It will thus be seen that in future all hotels above a certain size, which, under the existing law, are domestic buildings, will be classed as public buildings and be subject to the same conditions. The present definition of the "warehouse class" is extended by the addition of the words "any other building exceeding in cubical extent one hundred and fifty thousand cubic feet which is neither a public building nor a domestic building."

The most extraordinary thing in connexion with the subject of definition is that, like the existing Acts, the new Act for the regulation of buildings in London contains no definition of a "building"! Surely a most curious omission, and one likely to leave matter for dispute in the future. From the first schedule we learn that "every building unless otherwise sanctioned in accordance with the Act shall be enclosed with walls constructed of brick stone or other hard and incombustible substances"; whence we may perhaps conclude that structures destitute of these qualifications are not properly speak-

ing buildings; but as to what properly constitutes a "building," the new Building Act gives us no positive definition whatever.

From the definitions we pass to the regulations for the formation and widening of streets. These include some portion of the regulations formerly laid down under by-laws, but now forming part of the new Act. Streets henceforth are not to be widened, altered, or adapted save in accordance with the provisions in this portion (Part II.) of the Act. Though rather differently worded, the provisions for application to the Council, depositing plans of the street, &c., are practically the same as before, as also the requirement of 40 ft. width for a street for carriage traffic and 20 ft. for foot traffic. The proceedings which are considered to constitute the commencement of the laying out of a street are however defined (we have before referred to these), coupled with the rather curiously worded exception that "no person shall be deemed to commence to form or lay out a street if he do any of the acts in this section mentioned for some purpose other than that of forming or laying out a street." Who is to be the judge of the "purpose" with which the acts referred to are done? Then seven cases are given in which the Council may refuse to sanction a street, or may sanction it subject only to prescribed conditions. The first five of these are only different and more precise statements of existing regulations; the others are (6) where it is proposed to be laid out for carriage traffic with a gradient steeper than one in twenty; and (7) where it is proposed to be laid out in such a manner as to be in contravention of any by-law of the Council. If the Council do not give notice of their refusal to sanction within two months they shall be considered to have sanctioned it. The regulations as to the adaptation of "ways" to streets are practically a repetition of the same conditions as in regard to new streets. Clause 12 empowers the Council to require a greater width than forty feet, but not more than sixty, where they consider a wider street desirable. On the inadequacy of this provision for wider streets we have already expressed our opinion, and must regret to find it stereotyped in the new Act; a mistake which will be found out sooner or later. Clause 13, on the position of new buildings with regard to streets, in its first two paragraphs merely puts the same provisions in terms of building on the line of street instead of in terms of street-making, with leave of appeal to the Tribunal, on the part of the building owner. Subsequent paragraphs, however, provide that the Council may give special consent for the advancement of a building beyond the "prescribed distance" from the centre of the roadway (such consent not to affect the rights of owners of adjoining land\*), and that anyone wishing to alter or re-erect a building which within seven years† previous to the passing of the Act has stood within the "prescribed distance," may do so on the production of satisfactory plans showing the position of the older structure; with the proviso that no building inhabited by persons of the working class shall be erected within the "prescribed distance" to a height greater than the distance between its front wall and the opposite houses. This is probably one of the most extraordinary sentences ever seen in a legal document professing to be issued in the public interest. Why are the working classes to be thus nursed? and who are the "working classes," and who is to define them? No definition is attempted in the Act. In the case of any building carried beyond the "prescribed distance," except under the above-mentioned conditions, the Council may require the demolition and re-erection of the offending portion within the prescribed dis-

\* Query:—For "rights" read "duties"?

† We not infrequently receive letters from builders enquiring whether a house, of which they send a rough section, is of two or three stories; enquiries obviously prompted by some probably very proper pressure put on them by the local District Surveyor, who regards as a three-story house what they wish to regard as a two-story one.

† It may be noted that in this and several other clauses the term of "seven years" previous to the commencement of the Act is substituted for the term of "two years" in the existing law.



tance. For any case where the Council require a greater width than 40 ft. in a road, or make such width a condition of their sanction, a compensation clause is provided.

Similar considerations as to the prescribed distance govern the adaptation of a "way" to a highway. As, where the highway is in existence first, the building may not encroach except under the conditions provided; so where the building has encroached, the "way" is barred from being adapted as a highway. The Council may also sanction the encroachment of buildings within the prescribed distance for a limited time only, to be specified in their sanction. Nothing in this part of the Act, however, applies to any private road formed by any railway company for approach to a station-yard or to land used for railway purposes; the clause showing a tenderness for railway companies which is apparent throughout the Act. Where such roads are only lined by walls it is of little consequence. But how if they are lined by houses, perhaps occupied by the "working classes" (railway employés possibly)? This portion of the Act also is not to operate in regard to buildings erected on any land belonging to the School Board for London or over which they have powers of compulsory purchase: a proposition equally questionable—why is the School Board to be allowed to encroach, and thus set the bad educational example of traversing a law made in the public interest? Surely compensation might have met their case.

In the Part III, dealing with Lines of Building Frontage, the "fifty-feet clause," as it may be called, remains as before, with the same exception found in a good many other cases, that it does not apply to land which had been "lawfully occupied by a building or structure" \* within seven years previous to the passing of the Act. To this follows, with little difference of wording, the present provision for the setting back of buildings of which more than half the cubical extent shall have been demolished. To the general provision that the Council, in giving consent to an encroachment beyond the line of frontage, may attach any conditions to such consent, is added the statement of two special conditions which the Council may have power to require, viz., that land in front of the favoured building shall be dedicated to and left open for the use of the public, and that the building shall be used only for such purposes as are specified in the consent, except by further consent obtained. The proviso that consent to the encroachment of a special building beyond the line of frontage does not alter the general line of buildings in that or any other part of the street is only a cautionary notice, making the point more clear; the fact is the same under the existing law.

Part IV, on the Names and Numbering of Streets, may be passed over here, and we proceed to the important section on "Open Spaces about Buildings and Height of Buildings" (Part V.). The first clause of this (39) exhibits another irregularity as to definitions, for we have a new definition of a "domestic building" other than that in the list of definitions. In the former a "domestic building" (as at present) is anything that is not either a "warehouse" or a "public building"; but "for the purposes of this part (Part V.) of the Act the expression 'domestic building' shall not include any buildings used or constructed or adapted to be used wholly or principally as offices or counting-houses." The reason for this is obvious when we peruse Part V., but it would certainly have been more business-like to have added one more class in the definitions, between domestic building and warehouse; the expression "office buildings" would have answered the purpose perfectly well. As it is, we have the words "domestic building" confessedly having one meaning in one part of the Act and another meaning in another part; which is absurd,

\* The phrase suggests another question in *re* definitions: what is the difference between a "building" and a "structure"? They seem to be assumed to have different meanings, but neither is defined in the Act.

and is one among various indications that the final polishing of the details of expression and definition in the Act has been too hurriedly gone through.

Clause 40 is a new provision, in the case of domestic buildings having a habitable basement, for an open space of an aggregate extent of not less than 100 square feet free from any erection thereon above the level of the adjoining pavement, for the purpose of giving light and air to such basement. This is coupled with the rather obscurely worded exception that such "open space notwithstanding anything hereinafter contained need not necessarily adjoin the rear boundary of the premises." What is the special point of this exception we confess that we have failed to comprehend, unless it means that the space for light and air to the basement may be at the side instead of at the rear. This seems probable in connexion with the wording of Clause 41, but it is not clearly expressed. It may perhaps be explained by reference to Clause 29 of the 1855 Act, which provides that "every building used or intended to be used as a dwelling-house, unless all the rooms can be lighted or ventilated from a street or alley adjoining, shall have in the rear or on the side thereof an open space exclusively belonging thereto to the extent of at least 100 square feet." Apparently the provision intended in the 1855 Act for a whole house is now applied to habitable basement rooms. Clause 41 practically re-enacts Clause 14 of the Act of 1882, but in simpler language; any building abutting upon a street already formed shall have in the rear an open space exclusively belonging to it of not less than 150 square feet, the entire width of the building, and to a depth in every part of at least 10 ft. from such building, free from any erection except a closet or privy and a receptacle for ashes, none of such erections to exceed 9 ft. in height. A modifying clause provides that where there is a basement story sufficiently lighted (*i.e.*, we presume, from the side), or where there is no such basement story and the ground story is not constructed to be "inhabited" (in the legal sense before referred to), the open space may commence at the level of the ceiling of the ground story, or at the level of 16 ft. above the adjoining pavement. This allows for the prolongation of shop premises into the rear of the property. Then follows the provision (clause 41, iii.) to which so much attention has been drawn, in regard to the height of such buildings, with reference to the open space, when abutting on streets laid out after the commencement of the Act. The form in which this provision appeared in the draught Bill we have in a previous article quoted and commented on (*Builder*, Dec. 23, 1893, page 462); it is not well expressed, but is intelligible. The modification in the Act as passed is that the "diagonal line" may be at an angle of sixty-three and a half degrees with the horizontal line, in place of the originally-suggested forty-five degrees, which is sufficient for general purposes, and perhaps more in accordance with the rights or reasonable claims of property-owners than the angle of forty-five degrees. Chimneys, dormers, gables, or turrets may extend above this "diagonal line," provided they are not in the aggregate of more than one-third the width of the rear elevation of the building. When the pavement in front of the building is not on one level the "horizontal line" is to be drawn at its mean level; and in the same sense where the rear boundary of the "space" is not parallel with the rear wall of the building the mean distance shall be taken as the starting-point of the diagonal line, "whether such point be beyond the said boundary or not." When the line is so irregular in shape that a doubt arises as to how the measurement shall be taken application is to be made to the Council, or (in case of dissatisfaction) to the Tribunal of Appeal.\* In a case where the land

\* The Tribunal of Appeal differs in one important point from the Tribunal under the existing law. Two members,

at the rear of a building and exclusively belonging to it abuts upon a street or on an open space the maintenance of which is secured permanently to the satisfaction of the Council, the horizontal line shall be produced and the diagonal line may be drawn from the centre of such street at its surface level, or at the further boundary of such open space, and no open space need be provided specially appertaining to the building.

In the case of a building at the corner of two streets, or abutting on one street and on an open space not less than 40 ft. wide permanently secured as open, the Council may permit the erection of buildings not more than 30 ft. high on such part of the space in the rear as they may think fit (not interfering with access of light to neighbouring buildings), and corner buildings may be returned to the same height as the diagonal line allows to the front building for a distance of 40 ft., "or for such less distance as the requirements for open space at the rear may demand." In special cases of very irregularly-shaped sites the Council may make special modifications, not interfering with "due access of light and air." The "due access" is apparently left to the determination of the Council (subject to appeal). Domestic buildings abutting on a street laid out *before* the commencement of the Act may be regulated as to height by taking the horizontal line at a level of sixteen feet above the adjoining pavement and the open space provided above the level of this horizontal line, "except in the case of dwelling-houses to be inhabited or adapted to be inhabited by persons of the working class;" a repetition of the absurdity we have already commented on, and which in this case leaves a double problem—first, to define (legally) "the working classes," secondly, to define a house "adapted to be inhabited" by them. These provisions we take to be in reality bids for the working-class vote on the part of the Council. That such bids should be made on the part of a body of such political prejudices as the London County Council has turned out to be need surprise no one; but that they should be solemnly incorporated in an Act ostensibly designed for the general public welfare is contemptible.

The letter of the law as to the diagonal line may be overpassed in cases where the Council or Tribunal of Appeal is satisfied that an open cubic space of air will be provided at the rear of the building, equal to the open cubic space which would have been provided if no part of the building had extended above the diagonal line in accordance with the previous requirements. It is rather difficult to see how this could be, and the phrase looks like a contradiction in terms; but it is satisfactory as indicating a disposition to allow of reasonable departure from the hard-and-fast lines of the Act. It is also provided that nothing in this section of the Act applies to houses abutting on the river Thames or on a public park or on an open space of 80 ft. in depth which is secured as such.

Clause 42 provides specially for dwellings for the working classes, *i.e.*, "adapted to be inhabited" by them, whatever that may mean. Every person intending to erect such a dwelling must submit plans showing the extent and height of the proposed building and its position in relation to every other building existing or in course of erection "which is adjacent thereto." It would be interesting to know what is the legal definition of "adjacent." The Council may refuse to sanction such plans in any case where they are of opinion that there is not sufficient open space for the admission of light and air, provided that the refusal must be given within one month from the depositing of the plans. Why such a provision is confined to

as at present, are to be appointed respectively by the Institute of Architects and the Surveyors' Institution, but the third is to be appointed not by the Council (as at present) but by the Secretary of State, and no one of the three may be a member or officer of the Council.



houses "adapted to be inhabited by the working classes," when it might equally and with the greatest benefit be applied to all cases of blocks of houses in flats, it is impossible to imagine, except for the semi-political reason above suggested. Clause 43 provides that a person intending to erect a domestic building on a site occupied by a domestic building within seven years previous to the commencement of the Act, may erect the new building on the same site and under the same conditions on the deposition of plans showing accurately the position and extent of the previous building. Deviations from the certified plans may be permitted at the discretion of the Council and on appeal to it. These provisions again do not apply to "dwellings for the working-classes."

Anyone desiring to re-arrange a cleared area formerly occupied in whole or in part by buildings by laying out new streets or widening streets, &c., may apply and deposit plans and sections, and the Council may if they think it desirable modify or relax, for this case, any of the foregoing provisions of Part V. of the Act.

Clause 45 is an important new legislation in regard to open courts within buildings. Where such a court wholly or in part open at the top but enclosed on every side is used for admitting light and air to a domestic building, and the depth of the court from the eaves or parapet to the ceiling of the ground story exceeds its length or breadth, a communication between the lower end of the court and the outer air must be maintained for ventilation. This ought to apply equally to blocks of offices, which by the special definition of "domestic building" applied, as aforesaid, to this section of the Act, are constructively deprived of the advantage of this sanitary regulation; a distinct and serious oversight. The same clause provides that no habitable room having no window except into an enclosed court shall be constructed unless the width from the window to the opposite wall equals half the height from the sill of the window to the eaves or parapet of the opposite wall; but a court of which the greater dimension does not exceed twice the lesser dimension shall be held to comply with the provision if a court of the same area but square on plan would comply literally with it.

Clause 46 provides that the superintending architect shall determine which is the front and which is the rear of any building; a very necessary clause, considering the direct efforts that have been made on some London estates to evade the existing provisions by erecting blocks with "two fronts."

Clause 47 fixes the limit of height for all buildings except churches or chapels to *eighty feet* (exclusive of two stories in the roof, and of ornamental towers, turrets, or other architectural features), except by consent of the Council. The limitation, it will be seen, is pretty well watered down, and it does not apply to buildings contracted for before the passing of the Act. Where existing buildings forming part of one block or row exceed the prescribed height at the commencement of the Act, other buildings in the block belonging at the same date to the same owner may be hereafter carried to the same height as the first-mentioned building in the block. When in other cases the Council may consent to the erection of a building to a greater than the prescribed height, a notice of this consent is to be published within a week after it has been given, and the consent is not to be acted upon till twenty-one days after such publication.

A further provision as to height of buildings is made in Clause 49, that in any street laid out after August 7, 1862, and less than 50 ft. wide, no old building shall be raised and no new building erected to a greater height than the distance to the opposite wall of such street. That is to say, that streets under 50 ft. wide shall not have buildings higher than their width. It is noteworthy that in this clause nothing is said about excluding the roof from the reckoning of the

height, so that according to the wording of the clause the highest part of the roof must not be higher than the width between the buildings. This (unless it is an oversight) is almost more stringent than necessary; and, on the other hand, the change in the conditions when we come to 50 ft. wide is a curious anomaly. A street 49 ft. wide must not have buildings higher than 49 ft. to the top of the roof; a street 50 ft. wide (the width of Long Acre) may have buildings 80 ft. high on each side, exclusive of two stories in the roof. It seems impossible that this can long be left without some attempt at amendment.

It is allowable (Clause 50) to increase the height of a topmost story (in existing buildings we presume) to such an extent as to bring any habitable room constructed into conformity with the provisions of the Act as to habitable rooms; and any dwelling-house (clause 51) for persons of the working class previously erected by a local authority and above the prescribed height may be rebuilt to the same height and for the same purpose, but of not greater dimensions (in area) than the previous building.

By Clause 52 a domestic building and a stable building on a site abutting on one side on a street and on the other side on a mews may, under certain conditions as to the width between them and the height of the stable building, be regarded as one domestic building with the rear abutting on a street; and this whether in one occupation or not.

This is the last of the provisions for the placing of buildings; in our next we will summarise and consider the new provisions in regard to their construction.

#### SCARCITY OF WATER IN LONDON.

THE Metropolitan water-supply question is assuming a very serious aspect, for a great number of houses in North and East London are now absolutely without water during the night. The Hackney Vestry ventured a few days ago to call the attention of the East London Waterworks Company to this fact, and the latter has vouchsafed a reply which reveals a most astounding anomaly. The company explains the matter by saying that the "shutting down the service mains in certain parts of the district during the night . . . was rendered necessary, as the storage in the reservoirs had fallen far below the usual quantity, owing to the deficient rainfall, and the consequent non-repletion of the springs, which suffered from the drought of last year." In other words, the quantity of water at the directors' disposal, under existing circumstances, is not sufficient to enable them to provide a continuous day and night service. They tell the vestry plainly that "it is absolutely essential, and imposed, indeed, by the Public and Private Water Acts, that proper provision should be made in each house for storing a sufficient quantity of water to meet emergencies," and that if this were done the fact of their cutting off the supply would be "practically unfelt." They state that by their present action "upwards of 10 million gallons are conserved each night for distribution during the following day."

Here we have food for very solemn reflection. Traversing the company's statements we cannot help thinking that the directors have either grossly exaggerated their present position, or that, in view of the circumstances, the evidence given on their behalf before the recent Water Commission was extremely inaccurate. It will be noted that their excuse for not supplying a constant service in the districts alluded to is that they have not yet got over last year's drought. It is not our present purpose to inquire whether the rain fallen since that drought is in reality insufficient to raise the underground water level to its normal height—that would require a special investigation. But we may strike at the root of the matter by inquiring, if the drought is responsible for the curtailment of the supply—if the water-level in the chalk in the Lea area is actually below its

average height—why did the East London Company, when its representative was before the Water Commission, propose to obtain a further 13,000,000 gallons per day by sinking wells in the chalk? Or, is it that a considerable proportion of this 13 million gallons is now being drawn and the water-level is affected thereby? It makes very little difference which way we regard the matter. If the company is not drawing from the extra 13 million gallons, it is clear that it ought not to do so, for it would be merely impoverishing the stream. On the other hand, if it is drawing from this contemplated quantity, is it right to say that the present low state of the springs is altogether due to "the drought of last year?" Of course, we are perfectly well aware that according to the evidence of a certain witness before the Commission "there is something peculiar in the geological structure of the lower part of the Lea valley which enables it to yield an unusually large quantity of water," and we are familiar with the disposition of the strata concerned, and the views as to the direction of flow of the underground water. But we are also aware of the statement by another witness with reference to the point under discussion—namely, that if the New River and East London Companies together abstracted 30 million gallons a day from wells in the Lea valley they would lower the outflow of the higher streams; he said "I do not see how you can possibly take a large amount of water out of a chalk reservoir and not affect the streams." And, in our opinion, this witness was quite right. If the drought of last year was capable of producing such a disastrous result, surely the effects of future droughts ought not to be augmented by the artificial abstraction of water. However, we let that portion of the East London Water Company's letter pass.

The consumers have it thrown in their teeth that, by law, "proper provision should be made in each house for storing a sufficient quantity of water to meet emergencies." This is a fine state of affairs, after the consumer has abolished the cistern and gone to the expense of fitting up his house with regulation taps and appliances to suit the requirements of the constant service system! Where are the boasted advantages of "constant service" from the hygienic point of view, if the cistern is not to be done away with? The struggle with the water company for a continuous supply will have been in vain so far as domestic purposes are concerned.

The directors say that by cutting off the water during the night they are enabled to save upwards of 10 million gallons for the next day's supply. This we are utterly unable to grasp. The gross supply *per diem* by the East London Company is, in round numbers, 40 million gallons, according to the Report of the Royal Commission. It will be noticed that the 10 million gallons are reputed to be conserved by shutting down the service mains in "certain parts" of the district only, not by closing the whole. We do not know how many hours are included in the term "night," but it cannot be many more than eight hours. Putting a liberal construction on the term "upwards," and making a fair allowance for the use of water during the night in those portions of the East London Company's district not cut off, we may add, say, about 3 million gallons, making a total of 13 million gallons for the night supply, assuming the saved 10 million gallons were served out. We are now faced with a curious anomaly: the quantity used during the eight hours at night is as great as that used during each of the eight hours in the daytime—which is absurd. If it is not absurd, and the 13 million gallons are really used in the eight night hours, then it is nothing short of a crime that the inhabitants should be deprived of as much as 10 million gallons at a period when they appear to require it so urgently.



It is possible that a large portion of the million gallons is derived from prevention of waste; but waste takes place quite as much in the day as in the night, and the relation of the figures will thus remain the same. But whilst on this topic we cannot refrain from noting the reckless manner in which the classes constituting the large majority of the East London Company's customers waste the water. A staff of over thirty inspectors constantly employed and authorised to re-leather taps without charge is incompetent to prevent this waste, because it is not mainly due to defective fittings, but to the fact that taps are deliberately left running for hours and sometimes days together. It appears to us that instead of depleting the rivers and brooks in outlying districts by spending more money on well-extensions, the company would be better employed in exercising a yet stricter supervision over this wanton waste.

In concluding their letter to the Hackney Vestry, the Directors remark that "the additional powers granted the company in the (Parliamentary) Session just past will enable the Directors to increase their storage capacity in order to meet such a contingency as has now arisen." Then follows a somewhat bitter recrimination, which to the ordinary reader might seem to account for much of the Directors' attitude in this matter, did he not know that such a body would be incapable of allowing it to influence them in the slightest degree. It runs—Unfortunately, the application for similar powers was rejected by Parliament last year, otherwise the works of extension which the Directors had already resolved upon would have been well in hand." From which we are led to understand that the prime cause of the curtailment lies at the door of that convenient scapegoat—Parliament.

The Hackney Vestry will have the matter under consideration at their next meeting; but, in the meantime, the committee to which the matter has been referred will try to ascertain by what authority the company are acting in thus dealing with their customers in such a summary manner.

NOTES.

THE first portion of our report of the Congress of Hygiene we published (page 188, ante), a series of six resolutions proposed by Professor Corfield at the Congress of Hygiene at Budapest, clinched by a concluding resolution recommending that public authorities should pass regulations to enforce these provisions. To the advanced English sanitarian they seem not only innocent but almost matter-of-course proposals; but, as will be seen from the continuation of the report of the Congress in the present issue, the consideration of them raised a storm among the foreign sanitarians, or, as we should call them in this case, *in-sanitarians*. The sweeping condemnation of back-to-back houses seems especially to have stirred them to so much wrath that Professor Corfield suggested as an explanation that the foreign members had not properly grasped the meaning of the phrase. Our impression is, however, that they understood well enough what it meant, but that the Germans are so much behind us in sanitary experience and insight that they have not yet learned to regard even as questionable arrangements which we have long ago seen reason to emphatically condemn. Certainly, the spectacle of learned professors at a Sanitary Congress losing their temper because it is proposed to deprive them of the privilege of building back-to-back houses is a melancholy though instructive one. The fact at all events goes to show that International Congresses of Hygiene are not superfluous, and may carry sanitary light where it is much wanted. Professor Corfield's resolutions, though there was obviously no chance of passing them at the present Congress, are however to be

relegated to a committee, and there is yet time for enlightenment to descend on the back-to-back minds. The meeting place selected for the next Congress, Madrid, is not however a promising locality for securing the passing of sanitary enactments; but we must hope for the best. The very novelty of the thing may render sanitation an unexpected attraction to the Spaniard.

UNDER the title of "Contributions to the History of Olympia" (Olympische Beiträge), Dr. Konrad Wernicke publishes in the new number of the *Archaeological Jahrbuch*, a paper on the Heraion at Olympia, which is of considerable interest to architects as well as classical students in general. According to Dr. Wernicke, whose views we can here only summarise, this ancient temple, which was at first the seat of the conjoint worship of Zeus and Hera, lost much of its religious prestige when the great temple of Zeus was built. The main point is that about the time when the Emperor Nero visited the place it was transformed into a sort of art museum—such it certainly was when Pausanias described it, as he notes numbers of statues which, invaluable as they were from the point of view of art, had nothing whatever to do with the worship of Hera. At the same time the projecting walls (like internal buttresses), which have their close analogy in the Temple of Apollo at Bassae, and which in a structure of clay and wood had their obvious structural use, were abolished; they were useless in a temple the whole structure of which was made of stone, and considerable space for museum purposes was thereby gained. Respecting these partition walls, Dr. Wernicke has an interesting theory. He thinks they had a ritual as well as structural design. He conjectures that as the number of the partitions was sixteen, and as sixteen was the number of the priestesses who wove the peplos for Hera, the temple may have been in its early days a literal *γυναικωνίτις* (women's chamber) where the women wove their sacred web. This is the more probable as we know that they were divided into two bands of eight each, which would well correspond with the eight niches on either side of the temple.

THE Academy announces that the contents of the Ashmolean Museum are now being removed into the new buildings which have been erected, by Dr. Drury Fortnum's munificence, near the University Galleries, St. Giles's. It will be remembered that six years ago Dr. Drury Fortnum presented to the University the larger portion of his valuable collection, so rich in bronzes, terracotta, sculpture, and faience, which he had lent for exhibition at the Ashmolean. The old museum will, it is stated, be absorbed into the Bodleian, for which further space is needed. It was built by Thomas Wood in 1680-3, from Wren's designs, and in 1863 was renovated by C. Buckridge, and rearranged for a museum of antiquities, with an examination-room in its third story. J. S. Duncan, appointed curator in 1829, sorted and arranged the whole collection, greatly enlarged by subsequent additions to the original gift by Ashmole, which included the multifarious contents of the Tradescants' house, or "Ark," at Lambeth, whereof we gave an illustration in our number of June 18, 1892. Ashmole's association with Oxford extended over a part of the time during which a branch of the Royal Society met there; he had entered of Brasenose College when the city was garrisoned by the King's army, in which he served as a gentleman of ordnance. The son of a saddler at Lichfield, he practised for a while as a solicitor, and, besides his other attainments, was a leading authority upon medals and coins.

A REPORT by Mr. Wike, the City Surveyor of Sheffield, on granite paving, gives some useful information as the result

of observations on the use of granite setts for street pavement. The general conclusions to be drawn from the report are in favour of granite paving. It is shown that of a good many accidents from horses falling, attributed to the slippery quality of the granite paving, a considerable proportion did not really take place on the granite paving, and that the reports were consequently misleading and exaggerated. In the course of Mr. Wike's report the following points are urged. In the case of tramway streets the tramway company, who have to maintain a width of 16 ft. in the centre of the street, would object to keep in repair any material less durable than granite, as it would entail on them additional expense. A schedule is given of information supplied by the Surveyors of twenty-nine towns in England in which granite pavement is largely used. The observations of these Surveyors as to the durability of granite pavement are very striking. The Glasgow Surveyor says "40 years and another 30 after redressing." Sunderland, "40 years, and then can be taken up and laid elsewhere." Dublin, "30 years; still in fair condition;" Bury "paving down 8 years, and not a penny spent; say 30 years, then redressed, and 20 years more." Most of the reports are to a similar effect. In Sheffield the granite streets recently laid have been in very flat sections. From various indications in the report it appears that the chief danger of falls for horses is at the side portions of the streets where the section is rather rounded. The roads laid with "Gritstone" compare with granite very unfavourably as to wear and ultimate cost. The "Gritstone" pavement in High-street, Sheffield, was laid in 1891, cost 10s. 6d. per yard, has been occasionally repaired, and will soon have to be relaid. Some of the grit-sets taken up in 1891 had worn from 10 in. to 4 in. or 5 in. thick; but the time they had been down is not stated. The gritstone laid down in 1891 was not on concrete, but the Surveyor states as his experience that the gritstone pavement wears as quick if not quicker on concrete as on an ordinary foundation. In regard to the life of paving materials Mr. Wike estimates granite as 20 to 30 years with few repairs, gritstone 3 to 8 years, wood (deal) 5 to 7 years. This is on streets not subject to traction-engine traffic. The comparative cost of wood and granite paving as computed by the city of Manchester is given as follows:—

WOOD, AVERAGE LIFE, 15 YEARS.	GRANITE, AVERAGE LIFE, 30 YEARS.
s. d.	s. d.
Initial cost .....	14 6
Cost of taking up, cleaning and re-paving blocks once during lifetime ..	4 3
Cost of ordinary repairs, 15 years at 1d. per yard .....	0 3½
DEDUCT—	a. Value of foundation 1 0
DEDUCT value of concrete foundation .....	2 0
Total cost for 15 years .....	17 0½
Average cost for one year, say, 15, 1½d.	
	b. Value of old setts at time of renewal .....
	3 4½
	4 4½
	Total cost for 30 years .....
	7 4½
	Average cost for one year, say 3d.

It is admitted that granite becomes slippery without constant cleansing. The Paving and Highways Department of Manchester reports that granite pavements have been used for fifty years in their principal streets, "and have answered well when the streets have been properly cleansed, watered, and sanded." In regard to the sanding it appears from other information included in the report that liberal sanding is much desired by horse-owners, and is always effectual in removing slipperiness, but that it becomes a nuisance to shopkeepers from the sand blowing about. In Manchester wood-paving is being adopted solely on account of its comparatively noiseless character; it is considered to have no other advantage. The Manchester Paving Department, however,



reports that crossings in a particular district paved with small 4-in. granite cubes were found to be much more slippery than the larger setts.

THE thirty-eighth Annual Report of the Vestry of Chelsea has been issued. It has been resolved to light the Town Hall by electric light, and a sum of 277*l.* has been included in the estimates for the coming year for this purpose. The Vestry, which declined to lay down wood-paving in William-street, Lowndes-square, as long as the private bars in Lowndes-square and Lowndes-street remained, have now, on the removal of the bars, laid down the new paving. Sloane Gardens has been taken over by the Vestry as a "new street," subject to certain conditions. The Vestry has opposed the charges of the water company against consumers for putting in stop-valves in the public footways in connexion with constant supply, and has reported that it rests entirely with the consumer to determine where the stop-valve shall be placed, and that the company has no power to require a person who has a stop-valve within his premises to have it removed and placed outside in the public footway. Representations have been made to the London County Council with a view to the construction of a bridge for carriage traffic over the canal at Wedlake, in place of the existing footbridge. In regard to the question of "the unemployed" a deputation of various associations in the parish waited on the Vestry in December to urge that the Vestry should provide work, such as cleansing public streets, &c., in accordance with the provisions of the Public Health (London) Act, 1891. On the consideration of the matter it was reported that the provisions of the Act were being efficiently carried out, and that there was no productive work which could be put in hand immediately for the relief of the unemployed. A heavy fall of snow, however, in January, was taken as an occasion for the employment of 2,673 men at a total outlay of 524*l.* 3*s.* 3*d.* In regard to water supply it is noted that the Chelsea Waterworks Company are still at the bottom of the list of London water companies in regard to the extent of constant supply afforded. The interposition of the London County Council has, however, had the effect of raising the percentage of constant supply from 40 to 45 per cent. Certain isolated portions of the east end of the parish have been given a constant supply voluntarily by the water company.

ON November 28, 1862, were sold by auction the main buildings of the College of Advocates—commonly called Doctors' Commons—consisting of the court-house, hall (with a library on its upper floor), Great, Little, and Garden-courts, and a large garden. Covering nearly one acre, they stood on the ground bounded by Knight-riders-street, Bennet's Hill (Godliman-street), Addle Hill, and the present Queen Victoria-street. The site is now occupied by the Civil Service Stores and Post Office Savings Bank in the last-named thoroughfare. In about the middle of the sixteenth century Dr. Henry Harvey, master (1555-85) of Trinity Hall, Cambridge, obtained a lease from the Dean and Chapter of St. Paul's, at five marks per annum, of Mountjoy House, on the site we describe. Thither the college migrated, to live and dine in commons, from some meaner quarters at the Queen's head, in Paternoster-row. Mountjoy House, a stone structure, was consumed by the Great Fire, and rebuilt upon a more commodious plan for the advocates and proctors. The principal entrance was in Knight-riders-street: next south of the Bennet's Hill gate was the entrance, westwards, into some tenements which the Dean and Chapter's leases described as "Camera Diane," being so termed, the story goes, from an abode there of Fair Rosamund. The Admiralty Court,

established in Southwark *temp.* Edward III., was removed *circa* 1675, to Doctors' Commons, from St. Margaret's Church in the Borough, and again in 1860 to an upper room of the Law Courts, Westminster Hall. The late Probate Court and Prerogative Will Office stood on the site of the Savings Bank; the wills were taken thence to Somerset House in 1874. Various subsidiary offices were kept in houses near the main buildings. The Vicar-General's and Archbishop of Canterbury's Registry, Commissary and Consistory Courts, Bishop of London's Marriage Licence Office, &c., have for long been domiciled at No. 5, Dean's-court, between Carter-lane and St. Paul's Church-yard, a home of Sir Herbert Jenner-Fust, dean of the arches, and master of Trinity Hall, *ob.* 1852. That house, by direction of the Ecclesiastical Commissioners, will be vacated to-day (Sept. 29), for an extension of the Savings Bank, the Post Office authorities having already secured the ground between Carter-lane and Knight-riders-street. Dean's-court is marked for further change; the enlargement of an adjacent warehouse will involve the speedy demolition of the red-brick house, with a decorated stuccoed front, that stands over the archway in St. Paul's Churchyard: a house, according to tradition, occupied by Wren as his offices for some term during the building of the Cathedral. He is said also to have resided in Shoemakers'-row, Carter-lane. Wren designed the deanery-house, Dean's-court (1684), the Chapter House (1712), and St. Bennet's, Paul's-wharf (1677-83), erected by Thomas Strong and E. Strong, the elder, masons, wherein Inigo Jones was buried, and which, in 1879, was transferred to the Welsh congregation of London. The *Country Journal* of May 10, 1729, mentions Sheer's old office of Arms as being then "in Dean's-court near Doctors' Commons."

IN the course of next week will be sold for building purposes sixty lots of land, being a portion of Lady Ashburton's estate, latterly a farm, at Addiscombe, Surrey. The farm lands adjoin the former site, now built over, of the grounds of Addiscombe College. Evelyn records in his diary, July 11, 1703, a visit he made here:—

To see my son-in-law's new house, the outside, to the coveing, being such excellent brickwork bas'd with Portland stone . . . that I pronounced it in all points of good and solid architecture to be one of the very best gentleman's houses in Surrey.

The son-in-law was William Draper, who had inherited the Addiscombe estate from Sir Purbeck Temple's widow. The architect was, reputedly, Vanbrugh; Thornhill painted the walls and ceiling of the staircase and saloon. Having been occupied by Lord Chancellor Talbot, Lord Grantham, and Charles, first Earl of Liverpool, who died here in 1808, the property was bought by the East India Company, as a training college for their cadets, in 1809, the house we speak of, and with which we were familiar, being converted into the Governor's residence. William Wilkins, R.A., who built Haileybury College, was in 1827 appointed architect to the Company, for whom he designed the cadets' dining-hall, in the Grecian style, at Addiscombe. On the closing of the college thirty-two years ago the estate was sold and its buildings pulled down. Readers of "Vanity Fair" and "The Newcomes" may like to be reminded that Thackeray's stepfather, Major Carmichael Smyth, was an officer on the college staff, and that at Addiscombe most of the former's school-holidays were passed.

DEPOSITS FOR SPECIFICATIONS.—A firm of builders send us a printed circular sent to them inviting tenders, with a notice that the specifications can be had on a payment of 2*s.* 6*d.*, "not returnable," these words being underlined. Although the sum is small, this seems a most undesirable and unfair practice, and it is one calculated to lead those to whom it is addressed to doubt the good faith of the sender. If a deposit is required, it should always be returnable on the receipt of a *bona-fide* tender.

## THE HYGIENIC CONGRESS AT BUDAPEST.\*

IN Section VIII. (Hygiene of Towns), where the Chief Engineer of Budapest, Herr L. Lechner, presided, the most important paper read was upon the "Water Supply of Vienna," by the Chief Engineer of that city, Herr Franz Berger. Formerly—that is, until from fifty to sixty years ago—Vienna depended for its water-supply upon small wells dug in the country surrounding the town and on house-wells. The first attempt to provide a public supply arose out of the scheme commenced in 1837 for supplying the palace of the Emperor Ferdinand, by an underground aqueduct which, in spite of successive extensions, was not long of great use. Matters remained in this unsatisfactory condition until 1870, when the great Francis Joseph Aqueduct was commenced, which has its source in the Snow Mountains about 90 kilometres distant. Even this supply proved totally insufficient, and in 1878 new sources were found in the same mountains, and an auxiliary aqueduct has been built, the necessary works only being completed this year. The city since then can depend upon a minimum supply of about 13,664,000 gallons per day in winter and 23,296,000 gallons in summer. In consequence of the increase in the population through taking into the city the suburbs, this has become too small, and it is calculated that in the year 1900, when the inhabitants are expected to reach 1,673,500, 234,290 cubic metres will be required, allowing 140 litres (about 28 gallons) per head per day. In 1910, on an estimate of 2,000,000 population, 280,000 cubic metres will be required daily, and in 1920, with 2,400,000 inhabitants, 336,000 cubic metres. If two classes of water be supplied, 100 litres daily for culinary and 40 litres daily for other purposes, the capacity of the aqueduct will of course be correspondingly reduced, and if this be done the present sources of supply will suffice till 1920. Of course, the municipal council is already anxiously considering what is to be done. The following are the leading points of the scheme of future extensions:—further extensions of the headings in the Schneegebirge (Snow Mountains) new aqueducts from new sources of supply, and schemes for the supply of Danube water for other than culinary purposes. In all directions search is being made, and there are the best reasons to look forward to a favourable result. On all sides the beneficial influence on the public health of bringing water from the mountains was recognised, and by the statistics of mortality, had been abundantly proved.

On the fourth day of the Congress discussion only took place in one or two of the demographical sections, the majority of the Congressists taking part in one or other of a number of excursions, planned for them by their hospital entertainers, most of the English and American visitors electing to accept the invitation of Count and Countess Esterhazy, at the family seat at Totis, two hours' railway journey from Budapest. The Count, who speaks English like an Englishman, gave a cordial welcome to from two hundred and fifty to three hundred visitors, providing delightful drives and promenades in the interval between the entertainments, at table or in the castle theatre, where a farce was played, evidently got up for the delectation of English visitors.

Work was resumed in all the sections on Friday, the IX. and X. sections being chiefly occupied with the reading of the following papers, and the discussion of the propositions. Professor Corfield and Dr. Pistor, presented at the opening sitting of the section. Mr. Calver was appointed to preside. The first paper read was on the

Sanitary Construction of Dwellings, by Professor Banister Fletcher, F.R.I.B.A., & who commenced by saying that probably no more useful work could be attempted than bringing defects before a large congress, nearly all the members of which were deeply interested in sanitation, as it should surely lead to many experiments being made, and it would stimulate the inventive faculty, so that possibly at the next congress it might be his duty to announce some important improvements. With regard to the first part of the subject—namely, what had been done—he could only, in the limited time at his disposal, give a mere outline sketch. The advancement in "Building" consisted in the fact that they were no longer satisfied with badly-burnt bricks (such as place bricks), which could neither produce good nor sanitary building. They had recognised by law that even if the bricks were

\* Concluded from last number.



ood, the walls might still be bad, unless the bricks were put together with proper mortar, using a proper proportion of lime to sand, and they now prescribed the character and proportion of the work. For fear of being misunderstood, he desired to remind his hearers that during all periods good work had been done, and that no rules or regulations had been necessary to ensure that. Rules and regulations were only necessary in order to inform the ignorant, and to prevent those who wilfully desired to create buildings in an improper manner. Laws were not necessary for the honest citizen, but to keep in check the wrongdoer. By our various Acts of Parliament they recognised that most necessary precaution, the damp-proof course, preventing the damp from the ground rising up the walls, with all its injury to health. Again, they now prevented the brick coping from being used, and insisted upon brick on edge work laid in cement, and, as he had already said, such bricks must be of good material.

Again, they had a provision to prevent the damp passing through the face of the wall when the earth was against it. They had also recognised that no site on which buildings were erected could be healthy unless its surface was covered with 6 in. of concrete. Present legislation enforced this requirement, except where the land was gravel, sand, or natural virgin soil, when it might perhaps be omitted. With respect to the finishings, possibly the alteration under section 31 of the London Council (General Powers) Act, 1890, as to the composition of "plastering" was the most important; another question of importance was, why should not all round floors and basements have skirtings of cement, or some skirting other than wood, and should not all partitions be of brick-nogging, or of some more substantial character than the ordinary quarter partitions?

The most recent legislation which now awaited the Royal assent, was the London Streets and Buildings Bill. This fixes the smallest scantlings of timber, limited heights of buildings, increased yard space, and provided a new scale of limitation. This Act would come into force in January. It would be difficult to estimate the value of its provisions until some legal decisions had been given, deciding exactly that the Courts of Law considered the legislature meant by ventilation. Should not every sleeping-room in newly-constructed houses have some system of ventilation? Should not the ventilation under the lowest floor be more effectively done?

Another point was the pugging of floors. It appeared to him that some regulation was necessary to prevent "dry-rot" occurring, with all its accompanying evils.

In regard to plumbing, water-supply, and disinfectants, much improvement was necessary, and special efforts should be directed to obtain a court of appeal to ensure greater uniformity, or some years almost every Vestry and Local Board of Works insisted upon "wash-out" closets as the most perfect; to-day they were condemned as foul and unhealthy, and thousands of thousands of houses had been fitted with this closet, and of course the owners must bear the expense of altering. He would give one other example, that of the "Intercepting Trap." Some sixteen years ago one of these traps was built in brickwork in cement by a leading sanitary authority, and this very intercepting chamber he proved to be the cause of injury to health. To-day none were so built, for it had been superseded by the forms of materials they all knew, but even with regard to these we had recently had discussions upon their advantages or disadvantages. Another question arose with regard to the size of rain-pipe for an ordinary house? Should it be four inches or should it be six? Surely, if there were a doubt, experiments should be carried out to determine this.

On the subject of water supply he had long held the belief that the water-waste-preventers were a mistake. He knew not if they were in use in Budapest. He would suggest that the old valve-closet method of water supply by which you could get any quantity of water by holding down the handle was the proper method. The handle being released, the after flush was given. It was of course unfortunate that the cost of the valve-closet is so great, for undoubtedly if we well made it was the best water-closet we had at present.

With regard to inlet ventilators, of what value were the mica valves? He had seen them again

and again so fixed that the valve would not close, and Dr. Sedgwick Saunders was of opinion that where sufficient ventilation existed, the mica-flap was better omitted, it being an impediment to the constant flow of air. With regard to outlet ventilators, the latest experiments gave the curious results that the pipe open at the top acted as well as any of the exhaust ventilators in the market, but we wanted more information on this subject, and experiments should be tried.

Attention should be given to the experiments at Worthing—namely, the use of sea-water for flushing sewers, and this brought before them a much larger question—the supply of sea-water to large towns for bathing. He could scarcely conceive a greater benefit to the inhabitants of large towns than a double supply of water, first, because by having the second supply—viz., salt water, the present sources of supply would remain sufficient probably for all time, and thus the enormous expense of bringing water from fresh and very distant sources would be avoided. As to the sea-water, what a luxury it would be for public baths in towns.

Sanitation could not be confined to houses, and drains for houses might be rendered unhealthy by surrounding causes; thus, for example, the very roadway in front might be insanitary through the influence of wood pavements. Was it possible, whilst retaining the recognised advantages of wood, to invent some composition to impregnate the wood, and so prevent the nuisance?

One advance must be recorded; the examination of sanitary inspectors which Government would in the future require, would commence next year, and doubtless this would place the carrying out of the sanitary requirements upon a better and more uniform and intelligent basis. With all this progress there were serious drawbacks to good sanitary building. There was no one authority dealing with the subject as matters at present stood. Each man was a law unto himself, and vestries and local boards had rules and regulations differing from each other. All who were connected with the building trades knew only too well how curious were the variations—how one kind of closet, pipe, or trap could only be used in one district and not in the others. If an action was brought before the tribunals, no amount of scientific and practical knowledge would suffice to convince one court, while in another it might be readily accepted. What was wanted was some simple permanent Court of Appeal, which should sit whenever cases awaited its decision.

*Dwellings for the Working Classes.*—In the combined 9th and 10th sections the most important paper left was one by Mr. T. Blashill, (Architect of the London County Council), on "Dwellings Built in Blocks for the Working Classes by the London County Council." After referring to the recent course of legislation on the subject, Mr. Blashill observed that under these Acts it had been the practice of the Metropolitan Board of Works to sell land, when it had been cleared of the old buildings, to societies or individuals, who became bound to erect dwellings to be approved by the Board and the Secretary of State. This method being found very costly, the London County Council determined to keep the land and to pay for the dwellings built upon it. One of their objects was to prevent the serious loss experienced under the former system, but the main object was to keep full control over the erection and management for the benefit of occupants. The money borrowed for the erection of the dwellings at present built would be paid back in fifty-five years, and they would then belong to the municipality free of encumbrance. He proposed to deal only with the existing mode of carrying out the Act of 1890, and the particular class of dwellings now thought fittest for erection under that Act. Plans were exhibited on the walls of the room in which the section sat, and duplicates were placed in the corridor of the St. Joseph Polytechnic, where a portion of the Exhibition was situated—illustrating the mode of dealing with the "Boundary Street Scheme," occupying an area of 15 acres in the parish of Bethnal Green. The scheme involved the demolition of 728 houses, and the closing and removing of twenty streets; only two churches, three elementary schools, and one large factory being left on their sites. The area has been replanned on the radiating system of streets. From a central circular garden, 270 ft. in diameter, seven avenues, varying from 50 to 70 ft. in width, would radiate, the buildings occupying the intervening sites.\*

In designing new dwellings for the poorest

class, it had to be remembered that only the minimum amount of accommodation suitable for the residence of a family required to be provided. They must therefore be arranged upon comparatively small areas of ground. The Peabody Trust and the private societies that had been in existence for many years had provided dwellings in high buildings of from five to seven stories in height, and the general experience of these societies was that the rooms at the top let readily at a slightly reduced, or even at the same rent, as the lower stories, and were much approved of by the tenants. Objections had been urged against buildings of six and seven stories by medical officers, and by persons who objected to climbing stairs. The London County Council had, for the present, fixed the height of its buildings at five stories, the higher of any two determining the distance between them. They therefore demanded sites larger than those now generally available. The design of the dwellings for families now approaching completion or being planned for the London County Council was based upon the study of the most successful London buildings of recent date. They were not suggested as models, but as sufficient for families able to pay no higher rent than would provide such accommodation—the estimate assigning two persons to each room.

*Self-contained Dwellings* consisted of one to four rooms, but very few of the first existed, and it was his opinion that, unless in case of special convenience for their construction, they need not be provided. Families of two could easily find other dwellings, but the chief need was for dwellings of two or three rooms to accommodate families of four and six. Three-roomed dwellings were most needed for families with four children, these having great difficulty in finding accommodation; and, for similar reasons, four-roomed dwellings would be useful; but in the case of the smaller number of families with six children some might be earning wages, and such a family might take a small house.

Certain qualities, varying in different places, should attach to the smallest family dwellings. In London a self-contained dwelling should be entered directly from a wide passage or from the staircase landing, this entrance being, in fact, the outer house-door; the smallest width of stairs and landings being at least 3 ft. 6 in.

The Council demands a height of 8 ft. 6 in. for all habitable rooms; a floor measurement of at least 144 square feet, clear of fireplaces and other solid obstructions; floor surface of at least 96 square feet for every bedroom, a small scullery with sink, copper, and towel-roller attached to each living-room, and beyond the scullery an open lobby, giving access to a w.c., which was thus entirely cut off from the house.

The living-room fittings required a cooking-range, of 2 ft. or a little more in width, with oven and boiler. That used in the Council's dwellings was the Cundy range, having the oven below the fire. Close to the outer wall must be a ventilated food-cupboard, a coal-box and dresser with two drawers, having a pot-board for kitchen utensils under it, and three shelves were placed on the upper part, and a rail held about six coat-hooks. There must also be a cupboard for plates and other non-perishable articles. No fittings were provided in bedrooms, but sometimes a cupboard could easily be added.

On the calculation of two persons to a room, the so-called living-room must be used also as a bedroom, and must therefore be arranged to receive conveniently a bed for two persons, sometimes for the parents, sometimes the children; but sometimes this might be left unoccupied at night. The bedroom doors, probably left open, always communicate with the living-room.

After referring to points of drainage and sanitary appliances, Mr. Blashill said that the London County Council had desired to provide these dwellings at the lowest possible cost, and if possible, at rates within the means of those turned out of unwholesome dwellings. In some cases this object had been attained, in others not. The average earnings of tenants were 21s. per week, about the rate usually earned by messengers, labourers, &c. The average cost of the Council's buildings containing dwellings was £80 per room, considerably more than that of artisans' dwellings built by private societies during several years past. The latter had, however, ceased to build for the present, the cost of building having greatly increased during the past two or three years. The London County Council would expend more than a private society could afford for similar dwellings, being able to borrow money at the very low rate of 3 per cent.

*Associated Dwellings.*—On consideration of

\* We hope the audience did not accept this as representing the views of English sanitarians. A general reference to the valve-closet, with its complication of mechanism, its corners for catching soil, and its capacity for improper waste of water, would be a serious step backwards.—Ed.

\* We have already expressed our strong opinion against this radiating system, which we regard as a complete mistake.—Ed.



the whole question it was thought that the Council should, in the future, provide dwellings of a cheaper kind than those it has hitherto built. It would be remembered that the dwellings so far described were "self-contained" or "complete" dwellings, having their own sculleries and water-closets, but others were called "associated" dwellings, in which each separate dwelling would usually consist of a living-room with one bedroom, or with two bedrooms; but probably a few single-room dwellings might be provided, and it might be convenient in special cases to attach three bedrooms to a living-room. In these buildings there would be a common scullery for all dwellings on each floor, in which a sufficient number of sinks could be provided, and from it the water-closets for women and young children would be approached, those for men being provided elsewhere. [All these were shown in the drawings.] Facilities for washing clothes would be provided in connexion with the common sculleries, or in wash-houses built upon the tops of these dwellings, but no decision as to this had been reached, and possibly a central laundry might be built on the Boundary-street site for the use of all the dwellings; in which case no clothes-washing arrangements would be provided in any future dwellings erected on this area.

After these papers had been read, the mention of Dr. Corfield's resolutions (see page 188, ante) led to the most animated discussion held in the sections, if not in the whole Congress. On several points the disagreement between the English sanitarians, supported by Dr. Pistor, of Berlin, and a party led by Mons. Bechmann (Paris), Dr. G. von Mayr (Strassburg), and Herr Lindley (Frankfort), was complete. The main points of disagreement were with regard to fixing a minimum width for streets, the building of houses back to back, and the compulsory clause with which the series concluded. The English members were almost unanimously in favour of adopting the principle of the resolutions, but Mr. Arthur Cates opposed the sixth, fixing a minimum width of 12 metres for all streets, whether new or old; but most of the foreign members went with Dr. von Mayr and M. Bechmann, who formulated an amendment calling for the appointment of a committee to consider the resolutions and report upon them to the next Congress. At one moment the discussion took a heated and almost personal turn, Dr. Corfield declaring that the opposition to No. 6 which denounced "back to back" houses could only arise from ignorance of what was meant by "back to back" houses. In answer to the plea of *non possumus* advanced by the Strasburg and Frankfort champions (the latter is the son of the English engineer Lindley, who constructed the Hamburg water-works), he declared that there was no impossibility whatever in the matter. Back-to-back houses, said Dr. Corfield, were universally condemned by all sanitarians who knew what they were, and it was impossible to believe that any member of the Congress would fail to join in that condemnation who had ever seen those abominable constructions. Formerly in Liverpool, there were many thousands of such houses, and at that time the annual death rate of the town was a very high one. But at length they were doomed, and were disappearing by hundreds every year, the death-rate showing a distinct drop after every such disappearance.

M. Bechmann was almost equally emphatic. He said he agreed entirely with all that had fallen from M. von Mayr and Lindley, and would say with them that some of the resolutions were too general, and others too precise. The resolution numbered 6 would be inadmissible in Paris, and whatever might be said, it could not be applied generally in London, where many of the streets had houses on each side more lofty than the streets were wide. The resolution forbidding the building of back to back houses would be incomprehensible in Paris, and it could not be adopted. He would prefer the appointment of a committee to further consider the question, because at the present time they were not sufficiently advanced in the discussion of the subject to come to a definite vote upon it. With regard to the disconnecting-trap prescribed in No. 4, which in Paris might perhaps be considered admissible, he did not think it should be pressed against the opinion of Messrs. von Mayr and Lindley, who objected to it. With respect to back-to-back houses, all houses were so constructed in Paris, and they could not construct them otherwise. The representatives of that system, who could only pretend to follow *London long intervallo* in the path of hygienic progress, could obviously not admit that by a

resolution of an International Congress, their whole system should be condemned. In taking that course, he did not think he had merited the epithet, which, if he had properly understood, had been applied to him by Professor Corfield. As it became evident that the amendment would be carried, if the resolutions were pressed, the Professor proposed, with the consent of Dr. Pistor, to withdraw them. The question was now settled so far as the section was concerned, and it was understood that a committee would be appointed to report to the next Congress.

The resolute English professor was, however, not yet at the end of his resources. He had been defeated in the sections, but he might yet succeed in the plenary meeting of the Congress, to take place on the following day. The resolutions were therefore printed with the other resolutions passed by the sections, and perhaps the strife might have been renewed in a concentrated form had the Professor persisted in attempting to carry them.

The last paper read in the united IX. and X. sections was by Herr Ch. Siebreich, architect and civil engineer (Budapest), on "The Minimum Dimensions of Dwelling-houses," which showed that this engineer, one of the original founders of the Hungarian Institute of Engineers and Architects, like so many of his fellow-countrymen who follow the profession, has assimilated from English sources a great deal of sanitary knowledge.

This Institute, of which the Minister of the Interior, M. Charles Hieronymi, himself a civil engineer, is the president, gave a dinner in honour of the Congress, which was attended by most of the English members.

At the concluding meeting of the whole Congress, Professor Corfield read a letter from the Prince of Wales, expressing his interest, and that of the German Emperor, in the beneficent work of the Congress. It was also announced that the next Congress would be held at Madrid in 1897, on the invitation of the Spanish Government. On the testimony of all the delegates who addressed the meeting, the future results of the eighth Congress would be found to be profoundly important.

#### THE SANITARY CONGRESS AT LIVERPOOL.

THE fourteenth Congress of the Sanitary Institute has proved the most successful of the series. A strong local committee, with the Lord Mayor (Mr. W. B. Bowring), a life-long friend of sanitary science, at its head, was formed many months ago, and it was fortunate enough to enlist the entire sympathy of Principal Rendall, of University College, and of all his professors without exception. The result has been that nearly double the numbers attending the very successful Congress of Portsmouth have enrolled themselves, and the 950 Congressists find themselves very commodiously provided for in the series of spacious halls forming the Liverpool University, as the townsmen like to call it.

The proceedings commenced on Monday with a reception by the Lord Mayor at the Town Hall, a luncheon, and the inaugural meeting convened for three o'clock in the Main Theatre of University College, where the retiring President, Sir Charles Cameron, inducted the President-elect, Sir Francis Sharp Powell, M.P., in the chair.

The new President then delivered his inaugural address.

We give those portions of the address dealing with the branches of sanitary work with which our readers are most concerned. Speaking generally of the present position, Sir F. Powell said, in the opening portion of his address, "It is impossible to survey the field without a sense of satisfaction, almost of triumph. The difficulties which hinder our progress diminish both in area and in gravity. The necessity for devoted attention to conditions favourable to health is felt year by year both more widely and more keenly. No man has the false courage to deny this necessity: few men are unwilling to take some share in our labours or in the cost incurred by the adoption of our policy. There may be reluctance in some districts where the community has outgrown the proportions of a village, but has not attained the dimensions of a town. This intermediate state has been the cause of the greatest anxiety during the whole course of sanitary administration. It is in these communities that hesitation still lingers. It is to them that our persuasive energies must be directed. In large societies the urgency is felt, the machinery is ready at hand, public opinion is more active, the resources are abundant.

Improvement in public health has justified

both the cost and the labour expended. Some estimate of the expenditure of capital and the readiness to expend it may be formed from the fact that the Local Government Board, during the last twenty years, sanctioned a capital expenditure, chiefly for sanitary purposes, of 53,021,334*l.* in urban, and 3,923,270*l.* in rural districts, while, during the same period, local acts have authorised a further expenditure of 67,335,956*l.* Power to raise other loans for similar purposes has been conceded to other bodies, and to Commissioners holding power for special objects connected with the sanitary progress of the people. Vital statistics abundantly prove the wisdom of such expenditure. With these facts before us we must press forward, jealously maintaining the ground which we have secured and extending the boundaries of our dominion. This Institute must justly claim some part in this work. By meetings, by lectures, by literature, by examinations, we have at once spread knowledge and tested the accuracy of the information obtained by our students."

After treating of the subjects of quarantine, vaccination, adulteration of food, &c., Sir F. Powell said—

"Passing from this more special enumeration I must remind the Congress that public health must ever largely depend in great measures on the condition of the house. Rich and poor, urban and rural populations alike, have paid and still pay heavy penalties for errors and neglects. Knowledge of the course of legislation since the introduction of the Sanitary Act in 1866, I venture to assert with confidence that the duties of the Legislature have been amply fulfilled. Defects and mistakes in the statutes may be pointed out; but, speaking with all due reserve it may be once more stated without fear of disproof, that administration rather than legislation now demand the energy of the sanitary reformer. Localities, doubtless, have their own special wants; but even those are to a great extent met by legislative enactments recently passed. Exceptional cases will from time to time require private bill legislation; but even here precedents, almost equivalent to a code, appears now to govern, rightly or wrongly, the proceedings of the Committee of the House of Commons to which such bills are referred. The two London statutes of 1861 and 1894, following similar enactments for the provinces, and some minor enactments, supply the time, at least, the wants of the Metropolis. The reader of the latter statute will learn with disappointment that domestic buildings in London may still be erected to the height of 80 ft., exclusive of two stories in the roof, power be unfortunately reserved to the London County Council to sanction the construction of buildings even of more gigantic proportions. Air and light cannot perform their life-giving functions on the base of these structures, still less within the enclosed therein. The lighting and ventilation of such courts is left by the new statute in a favourable condition than that prescribed by the recent statute for the courts in Glasgow; and the rules as to height of rooms are less satisfactory than those which exist in many provincial towns or those which are voluntarily adopted by the Peabody trustees. It is not an exaggeration to say that the dwellings of our nation are being built to the course of the present half century. The erection of new houses and the destruction of old everywhere seen. They are erected under by-laws for the most part wise, and are maintained under regulations conducive to health. Errors of judgment hinder progress. The erection of back-to-back houses, for example, should never be permitted in new streets. Too great haste to defeat excellent intentions. Doubts are already expressed as to the system of huge construction under the name of Artizans' or Model dwellings. The Mansion House Council, no mean authority, describes certain blocks of artizan's dwellings as 'a difficulty which wants promptly dealing with' (These (say their committee) have been erected without any regard to sufficient air and light around them.' They add, let us hope with pardonable impatience rather than mathematical accuracy, 'that these places are haunts of filth and immorality.'

Be it also remembered that in rebuilding sites which have been occupied perhaps during many generations, by houses in an insanitary condition it will not suffice to clear the ground. The site itself is too often polluted, and must be thoroughly purified by the removal of all noxious matter and other effective measures.

But the most perfect structure must fail while under the control of unworthy tenants. This compels those who deal with this subject to



less that widespread neglect or even wilful destruction disgraces the condition of many cottages. The most complete discharge of duty by an owner is of no effect unless the occupant protects and cleanses the property committed to his charge.

Public authorities are helpless without the sanction of public opinion. Such opinion must be created by active agencies, by suasion, by personal visits, not of busybodies, who open more sores than they heal, but by self-denying, persistent, wise, and sympathetic visitation. No paid official can wait and persuade as can the kindly visitor. No summons or order can accomplish what may be done by such intervention. The story of the Manchester and Salford Sanitary Association and of the Mansion House Council is the same. Manchester and Salford are London in this matter, London is Manchester and Salford. Evils beyond the power of description have existed, by slow steps they are diminished or even disappear when encountered by such ministrations. No work was ever more sure of good result. But there must be no relaxation; there must be a ceaseless struggle against the downward current, else we shall float down the stream and lose all the advance so laboriously gained.

In this progress, as elsewhere, we must place confidence in our schools. It is difficult to believe that children who pass long and pleasant hours in cleanly and well-ventilated schools will rest content with dirty and unwholesome dwellings. These little missionaries may prove our best allies, and, by their gentle admonitions and nimble hands, aid in effecting those improvements which will so greatly conduce to their well-being, both in childhood and in later life.

The factory and workshop not less than the dwelling is comprehended within the wide range of our sanitary province. For them each political party shows equal care. The present Home Secretary executes with sympathy and full appreciation the statute passed by his predecessor. The employment, within wise limits, of Female Inspectors, especially as regards work-rooms, will reveal many secrets and effect long-called-for reforms. Increased security against accident, improved appliances for ventilation (none, be it noted, of avail without intelligent co-operation of the workpeople), and general conditions creating greater physical comfort during the hours of labour will increasingly improve the health of the artisan population. Much room remains for such improvement, but he must be a careless observer of the scenes around him who does not observe with gratitude the happy influence of these reforms throughout Lancashire and Yorkshire. Health alone for the moment occupies our thoughts, but it cannot be forgotten that the moral tone of the factory and workroom hands and their mode of life exert influences upon their health not less important than the conditions within the control of public authorities and of Parliament.

It will not suffice to guard the workshop and the dwellings from injurious influences within. The health of the people cannot be sound if the air be polluted. We must doubtless make sacrifices in order to conduct industrial processes. But the magnitude of these sacrifices must be diminished. We know the common saying in reply to a complaint of nuisance arising from smoke, that 'smoke brings money.' There is a new and better adage, 'smoke brings cost.' While more regard for the well-being of the neighbourhood may lessen the nuisance, economy of fuel arising from artificial scarcity may compel the adoption of arrangements which will lessen the discharge of smoke into the atmosphere, both from manufacture and from private dwellings. The working classes, now everywhere endeavouring to raise their condition, may discover that the smoke which renders cleanliness difficult and the brightness of a home impossible, imposes upon them labour which is unnecessary and cost which may well be spared. . . .

One exception must be made to the statement that improved administration rather than amendment of statutes has for the present the first claim. There is one necessity which presses with such urgency and force as to demand the most prompt and effective action. Long years have passed since the Royal Commission on River Pollution issued their report. Meanwhile the defects of the River Pollution Act have become matters of common knowledge. We cannot hope by one effort in one generation to restore our streams to their original purity. But we can do much. The industrial system of this country has, relatively to the age of our civilisation, continued during but a few years.

Those years have been a period of rapid, but not always well-considered or comprehensive extension. The grandfathers of men now active among us were the founders of our manufactures. Let those, who, with infinitely greater advantages, gather the fruits of their toils, remove the evils which have been created during years of immaturity and of haste. The effort is worthy of such labourers as we summon to the task.

Here as elsewhere Local Legislation has led the way. In the year 1892 the Manchester Ship Canal, soon to be supplied with waters from the Irwell, threatened pestilence to widely-populated districts. The Mersey and Irwell Conservancy Rivers Pollution Prevention Bill became law. It is no fault of the joint committee, which is the executive authority under that Act, that Her Majesty when opening the canal was prevented by the condition of its waters from passing more than a few yards along the channel. But this incident, the recurrence of which the energies of that efficient committee will render impossible, is ample demonstration of the magnitude of the mischief. Where the Sovereign was advised not to pass, a large community of her people dwell. What Lancashire and Cheshire has accomplished, the West Riding of Yorkshire, experiencing similar, but not equal, difficulties, has sought to effect. The West Riding Conservancy Act of 1894, following a Provisional Order Act of a former year will bring under control rivers and streams which are now dangerous to public health and a disgrace to our manufactures. Some details of administration in the Bill as finally passed are, in my judgment, less effective than corresponding details in the Mersey and Irwell Act. But the modifications may remove friction and may thus, although less satisfactory in form, prove not less effective in administration. They may also assist the County Councils' Association when considering the new print of the River Pollution Bill, which will be introduced in the next Session. The Bill has been twice submitted to the House of Commons, but its further progress was prevented by the unfortunate condition of our proceedings, which permits any one member by one scarcely articulate expression to prevent the most valuable legislation. I am not without hopes that Government will grant an inquiry by a Select Committee. Those who feel difficulties would thus have every opportunity of stating them, and Parliament would be better prepared to decide as to the concessions which ought to be made to the exigencies of manufactures and the susceptibilities of some municipal authorities. The Government of the day may then undertake a task which appears for the moment, and in the present condition of our procedure, to exceed the opportunities of non-official members.

The Thames Conservancy Act of 1894 is another step in advance. One strange concession to a steam navigation company supported, as we may assume, by sufficient evidence is, to my thinking, a blemish to the Act, but as a whole the legislation respecting the Thames is worthy of the occasion. Sewage or any other offensive or injurious matter is not to pass into the Thames or any tributary through any sewer-pipe or channel, not at the passing of the Act lawfully used for that purpose. Even in such cases the Conservancy are directed to give notice to the person causing or suffering the flow or passage of such offensive matter to discontinue the same within three months, power being given to extend the term to meet exceptional cases. An appeal is given to the Board of Trade, which is without any officers trained to decide such a question, instead of to the Local Government Board, which commands the willing services of a highly qualified scientific staff. Such eccentricities of Legislation are, however, but too familiar to us, and, though deeply to be regretted, are condoned by those who know the difficulties of effecting any reasonable reform by Private Bill, or, indeed, by any other method of legislation.

In the above remarks I have entered upon no descriptive details. They are but too well known. Would that any words from me as occupant of this Presidential chair could induce men in responsible positions to give us, in these our efforts, the weight of their high authority and their great influence. To any lover of his kind it is melancholy to dwell on the scenes presented on many river banks and in the streams themselves. We desire the advance of our people in health, in culture, in sense of beauty. Such advance is impossible when they live amid such surroundings. Let reform be made quickly and effectively. The time for reform has come. Any unnecessary delay in a question of such moment cannot justly escape censure or even severe condemnation. . . .

There is, without question, ample opportunity

for valuable discussion with a view to possible amendment on the law on what may be described as collateral subjects, not ordinarily included within the category of laws affecting public health. . . . The occupants of common lodging-houses, the humblest of our population, require further protection during their sojourn in such dwellings. Much remains to be done before our slaughter-houses and arrangements connected therewith are wholly satisfactory. Although the increasing wants of London have been in some degree met by the East London Water Act of last Session, the exhaustive Report of the Royal Commission on the Metropolitan Water Supply claims the fullest consideration from those who have responsibilities within the Metropolitan area. This necessity arises not only from difficulties connected with supply of water, but also from the mischief caused by the diminished flow in the Thames. . . .

Let us wait no longer for new laws, but put into effect the laws already on the Statute Book. There may be some return of population to rural districts, but a vast proportion of our inhabitants must continue, and probably in growing proportions, to dwell in urban districts. This tendency appears to prevail throughout all civilised countries. A German writer cited by the Reporter for the Labour Commission remarks that "It is a phenomenon of annual recurrence that the harvest cannot be got in at the right time. In some districts the supply of labour is insufficient even in the winter. The physical and moral health of our nation, as well as its military strength, suffer the most grievous injury from over-rapid pressing into city and factory life and from trans-oceanic emigration." We must therefore with all zeal bestow energy and knowledge on the improvement of our towns. To the attractions already dominant let there be added those of health, and even of ornament. Already the records of death prove that the proportion of deaths in many towns does not differ as widely as of old from the proportion in rural districts. Let that difference lessen to the vanishing-point. Towns have at their command efficient drainage, ample supply of water, prompt removal of refuse. They are acquiring by slow but sure degrees arrangements of their dwellings favourable to health. To the spacious parks, so civilising in their effects, must be added the open spaces protected from all cause of annoyance, where the toiler may seek repose near his dwelling among pleasant surroundings during the intervals of his labour. Lord Meath's Public Garden Association can now claim between one and two thousand acres of open spaces as the result of their efforts within the Metropolis. What has been done in London must be possible elsewhere.

The baths and wash-houses, no longer so far removed from the dwelling as to be of little avail to the workman in his comparatively distant home, will throw out branch establishments for himself and his family within reach of his dwelling. The gas-engine and the mysterious agency of electricity, giving motion, heat and light, will remove many debilitating and uncivilising influences. The desire for a higher life, now so salutary, acting through an intelligent public opinion, will accomplish these beneficial reforms; and our towns retaining all their colossal grandeur and their power, will be the scenes of ever-increasing refinement. I know well—no man can know better than myself—the disappointments, the mortifications, the fatal illustrations of the weaknesses, incident to our nature, which will impede our course; but the duty remains the same. Progress, already made, gives confidence for the future. I, speaking for myself, am full of hopes. Those hopes will be in a large measure fulfilled if the advance of the next half-century is equal to that made in the fifty years now counted among the past. I see on every side reasons for encouragement, none for holding back. There is everywhere fuller knowledge, riper experience, more sympathy from public opinion. Let us all press on in our great task, each a thoughtful and active worker in his own province. Our reward will be seen in every home which we purify, every family which we strengthen, every population which we elevate. None can foresee what struggles are at hand, what rude encounters are near, what severe competitions are to be met. It is our endeavour and our duty to prepare our nation for every trial, to give strength to bear hardship, vigour to conduct the contest, endurance to persist until the victory is gained.

After the usual thanks had been accorded, more than 200 members of the Congress, delegated by County Councils, City, Borough, and Urban Authorities and Societies in every part of the



United Kingdom were presented to the new President.

The proceedings of the opening day were completed by the formal opening by the Lord Mayor and the Lady Mayoress of an extensive Health Exhibition occupying the large Drill Hall of the 2nd Volunteer Battalion Lancashire Regiment. After a promenade of the chief guests through the Exhibition, Dr. Wynter Blyth, chairman of the committee of judges, announced the awards of medals and certificates, and made a report which compared very favourably with the most successful of the thirteen previous exhibitions.

Medals were awarded for disinfectants to Boake, Roberts, & Co., Stratford, for Liquid Sulphur Dioxide; F. C. Calvert & Co., Manchester, Pure Carbolic Acid; certificates to Jeyes' Sanitary Compounds Co. for Fluid Coal Tar Disinfectant; Newton Chambers, & Co., Thorncliffe, for Izal Disinfecting Fluid. Earthenware Appliances—Messrs. J. Cliff & Sons, Wortley, two medals for Ceil Porcelain Sink and Imperial Porcelain Slop Bath; Doulton & Co., for Metallo-Keramic Joint for connecting lead to earthenware. Certificates were given to J. Cliff & Son for Porcelain Kitchen and Scullery Sinks; to Doulton & Co., for Glazed Fireplaces; and to Thos. W. Twyford, Cliff Vale, for Combined Lavatory Basin.

#### CONFERENCE.

The second day of the Congress was devoted to conferences in five sections devoted to different groups of subjects. They occupied separate lecture theatres under the following Presidents:—Municipal and County Engineers—Mr. A. M. Fowler, C.E.; Sanitation of the Mercantile Marine Service—Sir W. B. Forwood; Medical Officers of Health—Dr. Charles E. Paget; Sanitary Inspectors—Dr. Francis Vacher; Domestic Hygiene (Ladies' Conference)—The Lady Mayoress (Mrs. W. B. Bowring).

#### CONFERENCE OF MUNICIPAL AND COUNTY ENGINEERS.

Mr. A. M. Fowler, C.E., took the chair in this, one of the most numerously-attended of the five conferences, in the Engineering Theatre of University College precisely at 10.30, and delivered an address of which the following are the chief points. Among the questions of the day demanding the most serious consideration from sanitarians were the three following:—

1. The improvement in the condition of the dwellings of the working classes, and the development of facilities to meet this end.
2. The improvement in the surfaces of the streets and ground in our midst.
3. The water supply for domestic use.

"With regard to the first of these essentials," said Mr. Fowler, "I am of opinion it is futile to endeavour to gain—or, shall I say mature—a condition of hygiene in the absence of satisfactory dwellings being provided for the poor; for it is here where the initial stage of contagious diseases invariably germinates. The question of housing the poor, we all know, has been discussed from time to time during the past eighteen years, and hundreds of thousands of pounds have been expended on what has been called the improved system of building blocks of artisans' dwellings, and I am free to admit that it is an improvement on the former state of things; but on the other hand it is (in my opinion) as yet far from satisfactory. Some of these blocks stack (so to speak) together as many as 1,000 individuals under one roof during the night. It is true a thorough ventilation is obtained in the daytime; but this is not secured during the night. To house the poor in such heaps is not the best way of meeting the difficulty; inasmuch as the tenants are excessive and there is no chance of the tenant becoming the owner of his home, the number of people per square yard of land is excessive. The crowding together of so many under one roof tends to the absence of independence and has a demoralising effect. And, again, the houses erected after the Local Government Model Bye-Laws—demanding a thorough passage and ventilation, with ground space at the back or side—have a tendency to create much self-sacrificing on the part of the tenant, inasmuch as the rooms have often to be let off to lodgers owing to the necessary high rents; whilst the back-yard premises often become occupied with poultry and an accumulation of rubbish, resulting in filth. I have therefore come to the conclusion that the back-to-back house self-contained (as so extensively constructed at Leeds on the modern plan) is the best class of house for the working man,\* for the following reasons:—

\* We duly report this remarkable recommendation, hoping, however, that some at least of Mr. Fowler's

There is as a rule 4 square yards for each person under one roof, and nearly 1½ square yards of appropriated land area (to centre of streets) as compared with the excessive number of persons per square yard under one roof in artisans' dwellings.

These cottages are built in blocks of eight—four back-to-back, with a twelve yards street in front, with a space of 15 ft. at the end, or between each block. The streets are well paved, and the interstices of the stones are filled in with asphalt run in hot, and the footpaths flagged. The land upon which the houses are built is freehold, and invariably the tenant is the owner. These cottages are the most cleanly of any such dwellings in large towns. The outcome of all this is that the working classes are settled, and nearly three-quarters of the householders are owners (through Building Societies) of the houses in which they live. As an instance of self-reliance, a working man in Leeds pays 3s. or 4s. per week, including interest, until the principal and interest amounts to 40l. or 50l. He then withdraws and purchases a house for say 160l., borrowing the difference, viz., 120l., from the Society. But he has to pay 3s. per week to the society for twenty years more when his house becomes his own; otherwise he would have to pay as tenant to a landlord 4s. 3d. per week, and the house would not be, of course, his own. Thousands of houses have been built in this way, and there is no part, so built, overcrowded. Compare this with, say the Victoria Square block for example, where a three-roomed house is charged 5s. 6d. down to one room 2s. per week, and no chance of the tenant becoming the owner, the death-rate when deaths in hospitals are taken into account in connexion therewith is upwards of 16 per 1,000. The true artisan has a horror of dependence, as all true Britons have; therefore an effect of patronising should be sought to be avoided by giving him a chance of self-reliance, control, and independence, and ensuring him (as I have shown) of having the profits of his own savings.

The Royal Commission's Report of 1884 condemned the leaseholders' system as detrimental to the health and prosperity of the working classes. The Report says:—

"Evidence has also been given as to the system of the middlemen, of house jobbers, house farmers, or house knackers; for by all these titles are designated those persons who stand between the freeholder and the occupier, and who fix and receive the rent of tenants' houses. The covenants to repair, cleanse, paint, and keep the drains in order are attended with an indisposition to enforce the troublesome and costly process. The system of building on leasehold land is a great cause of the many evils connected with overcrowding, unsanitary buildings, and excessive rents. This appears to be conclusively proved by the evidence of Lord Wm. Compton, Mr. Boode, (the agent of the Marquis of Northampton), Mr. Vivian, of Cranbourne, and others."

Forty years ago, continued the President, the death-rate of Leeds was 40 per 1,000, now it ranks with the healthiest of the manufacturing towns of the kingdom.

With regard to the construction and maintenance in a sanitary condition of the streets and roads of large towns the President said the enormous saving by improved roads could not be over-estimated, but as the benefits cannot be clearly shown on the books of a Corporation, the cost of hardwood pavements, or nearly noiseless asphalt, with the constant removal of filth, was apt to be regarded as extravagant. There could be no doubt that the floating particles in the atmosphere creates lung diseases, as in manufactories where the dust of coal, sand, steel, cotton, and hemp, also from stone quarries where the workmen suffer by inhalation. But the suspended matters in the air in large towns chiefly consist of dust from refuse and organic matter, and imperfectly consumed particles of coal.

The reduction of dust and dirt must conduce to the health of the people—must reduce the death-rate, which meant economy. The saving of life in Leeds alone, taking Dr. Farr's estimate of 150l. per head as the average, was 82,229l. a year as compared with twenty years ago. The plan adopted in Manchester in laying wood pavements was well calculated to minimise the accumulations of dirt in the streets. The joints of the pavement were filled in with asphalt and tar.

audience knew better than to believe such nonsense. That the self-contained house is better for the working man, where it can be had, than the block of "model dwellings," we fully agree; but that back-to-back houses should be at this day seriously recommended at a so-called Sanitary Congress is too absurd.—Ed.

The benefits accruing to large towns from a supply of soft water were also of great importance. Hard water involved the use of a considerable amount of soda, and sometimes lime, which is destructive to linen and all washing garments.

A saving of at least one-half might have been effected by using soft water.

The purification of sewage had excited a great deal of discussion, and many competing schemes were before the public for realising that object, but the cost of carrying them out made most of these schemes impracticable. The filtration of sewage, either through artificial filter-beds or through land, appeared to offer the best prospect of success. This plan was carried out at Antwerp, where, in 1885, filter-beds had been constructed which were composed of sponge iron and sand, and everything went on well and in perfect order, and good results obtained until the scheme had been working some eighteen months, and, most singular to say, that after this period it was found that the soft nature of the water of the river Neath, into which the sewage, from a population of 97,000 from three towns, flows, before it was pumped, softened, and dissolved the iron to some extent, and it was found that a thin film of carbonate of lime formed beneath the surface of the filter-beds, with the result that the application of sponge iron has now to be applied by means of revolving filters.

Thus even this scheme, which had succeeded, had to be reconstructed before giving good results, the inference from which was that all schemes for purifying sewage by artificial means must be looked upon with caution. The effect of filtration was to destroy the bacteria.

In conclusion the President said the subject that has been specially selected for consideration at the Conference was the Construction of Refuse Destructors. Certain papers would be read describing various systems in use, some of them by the inventors of the apparatus; but it must, of course, be clearly understood that the selection did not in any way imply the approval of the Congress with regard to any of the apparatus described.

## Illustrations.

### MARBLE STAIRCASE, GLASGOW MUNICIPAL BUILDINGS.

HERE are two principal staircases in the Municipal Buildings, entering from opposite sides of the Loggia, but on the Council Hall floor they are connected, and form a vista of marble walls and arches 180 ft. in length.

Our illustration, taken from the architect's (Mr. Wm. Young) Royal Academy drawing, gives a view of the staircase leading to the banquetting hall and salons.

The design is a piece of pure masonic construction, ornamentation and carving being avoided, so as to give full value to the rich marbles which were selected to produce decorative effects.

The panels in the lower part of the walls are of selected alabaster, to give the suggestion of pictures, and the effect of seascape, mountain and cloud forms shown on the drawing is copied from the executed work.

The upper part of the walls, showing behind the arches, is of dark alabaster, forming a frieze above the lighter marble and alabaster walls below it.

The panelling of the walls is of alabaster, with mouldings and margins of dark and light marbles. The columns are Brescia and alabaster. The floor is of Numidian and black marbles. The steps are solid veined marble, the balustrade alabaster, and the capping and base veined marble.

W. Y.

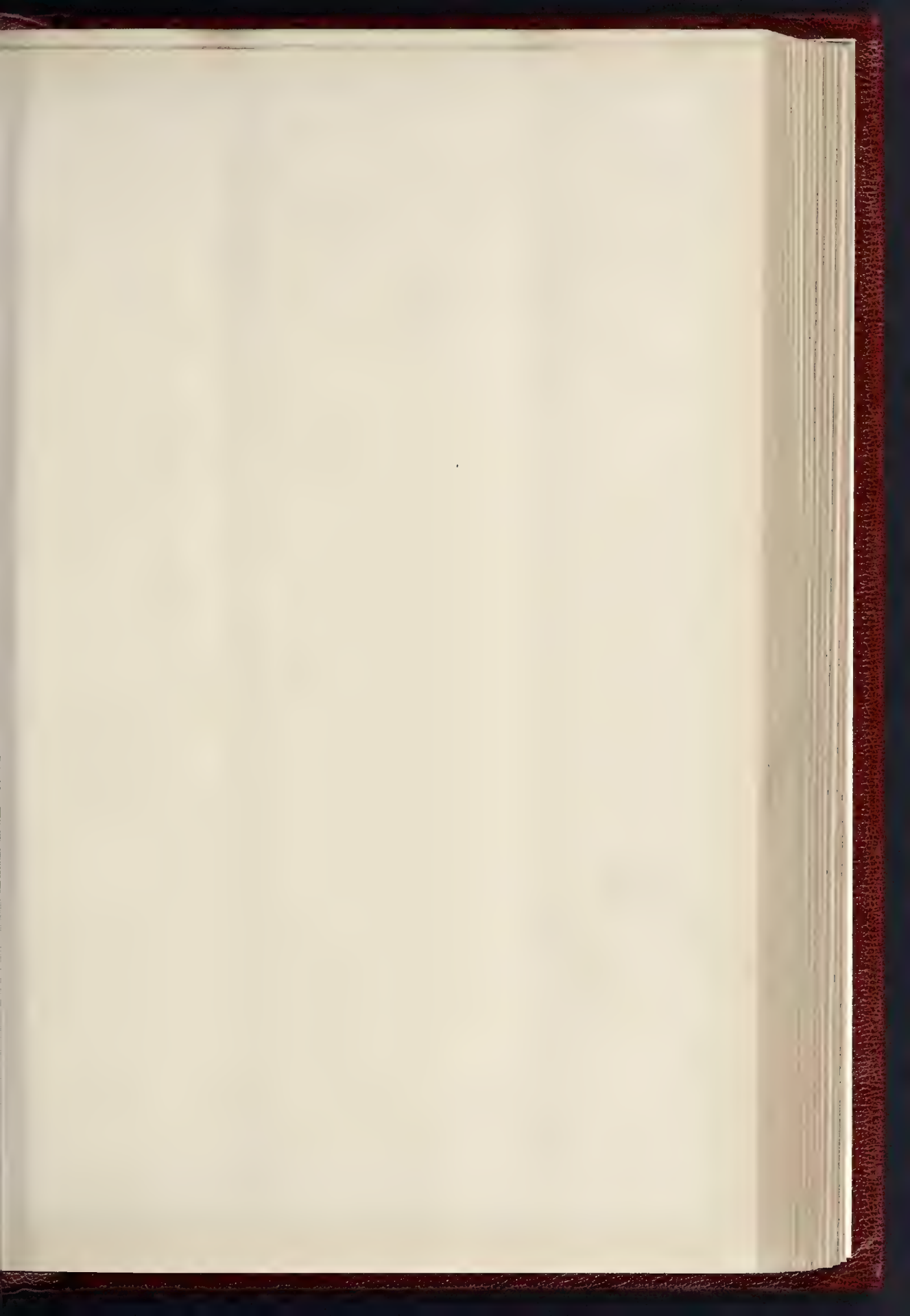
### HOUSE AT HAMBLE.

THIS house is now being built at Hamble for the Hon. Alick Yorke.

The plan and general design are based on a house already built at Northwood, four rooms and a servants' staircase being added. The walls are faced with red bricks, and the roofs are tiled. The whole of the woodwork will be painted white except the shutters and windows and the entrance doors, which will be painted bright green.

The general contractors for the work were Messrs. Green & Abbott, of London, and the contract price was 1,300l.

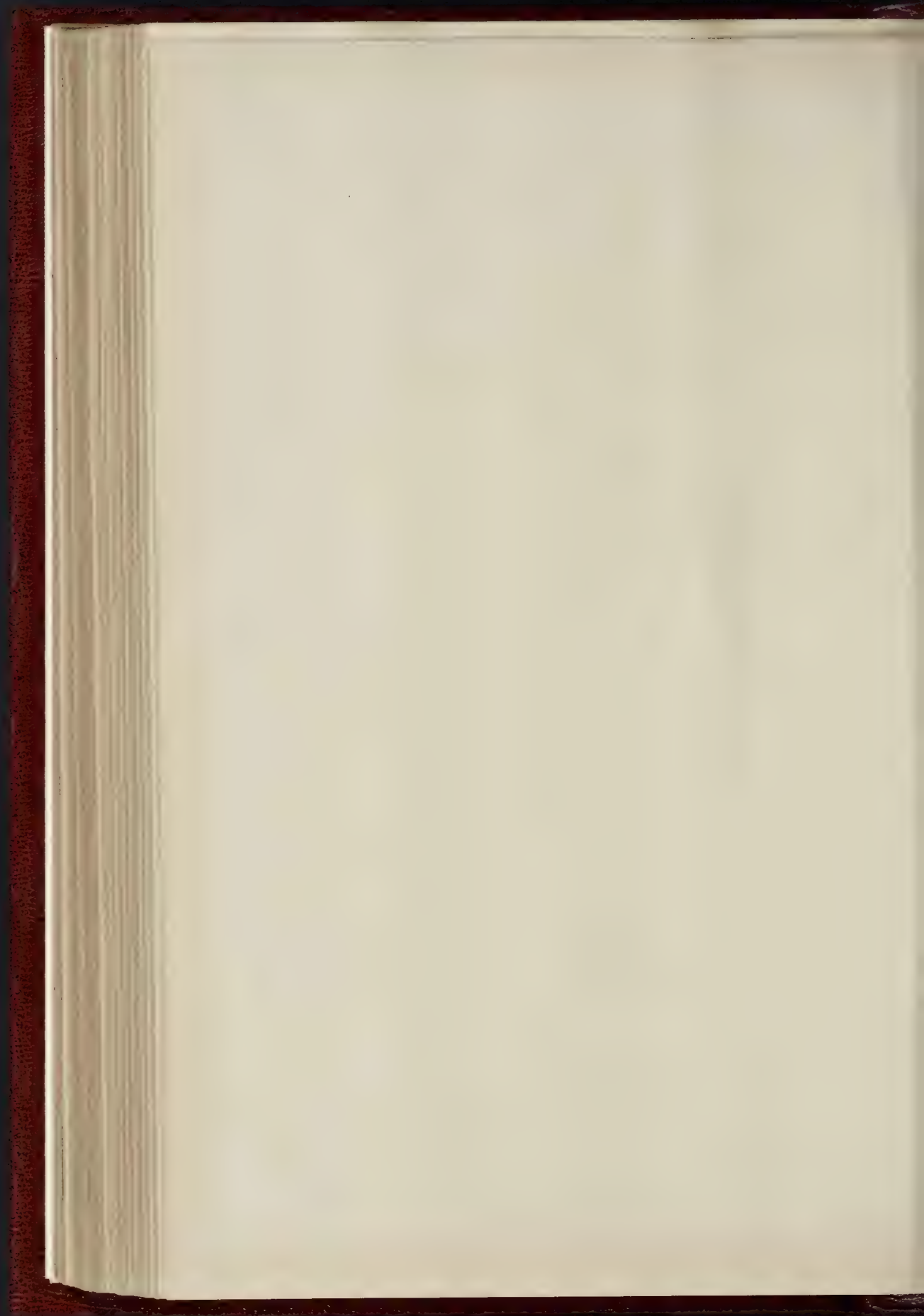




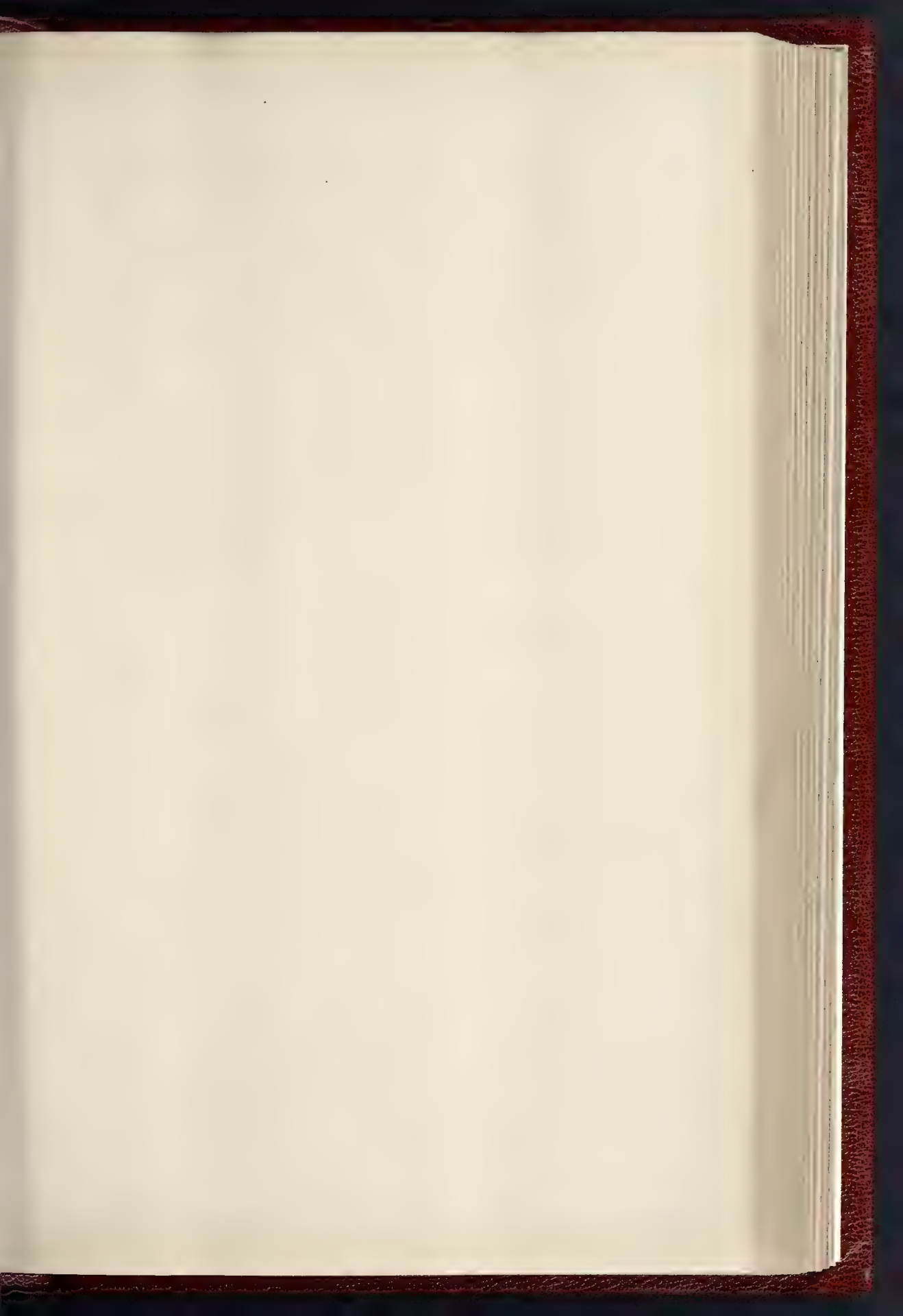










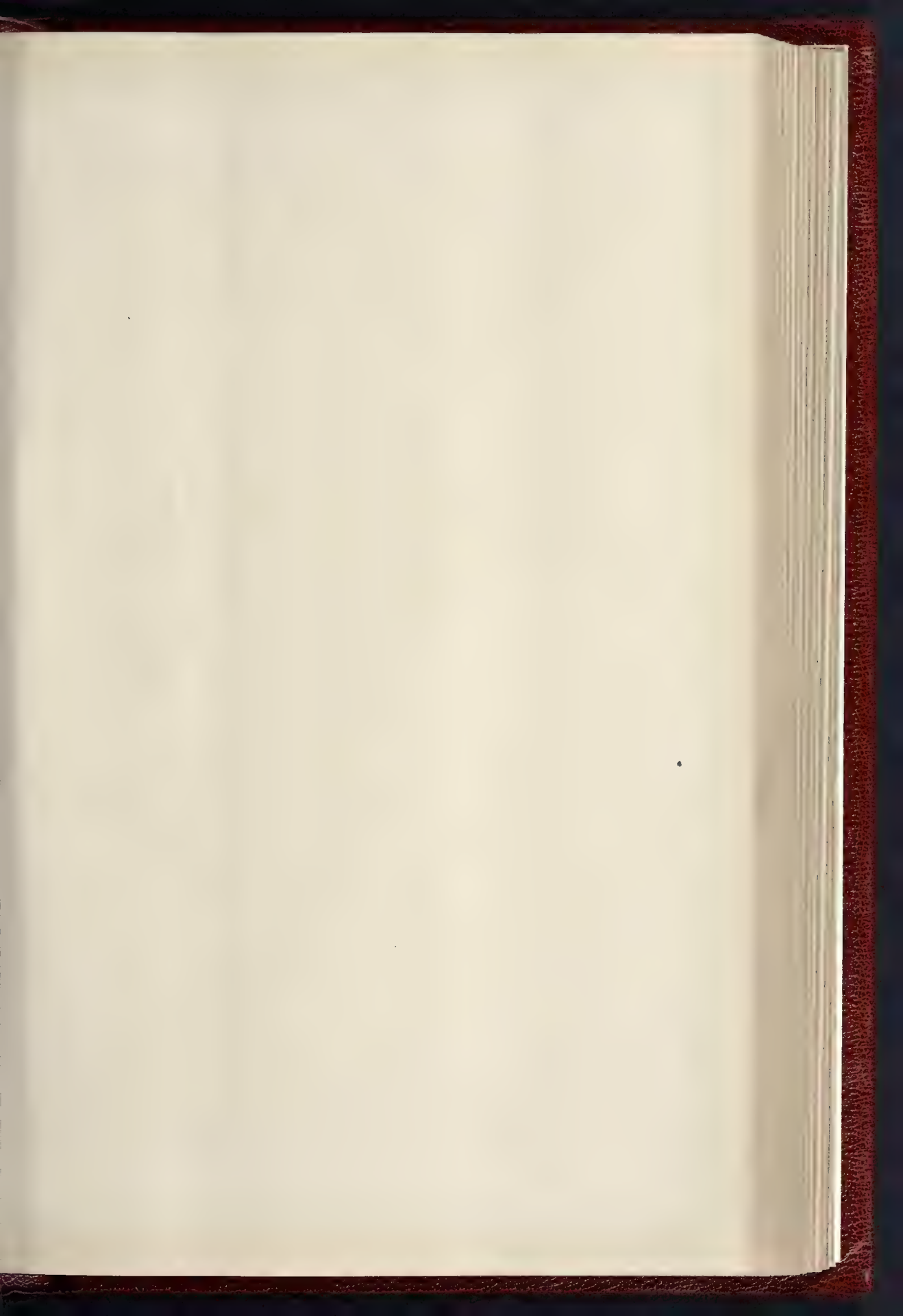


THE BUILDER, SEPTEMBER 29, 1894.

MUNICIPAL BUILDINGS ETC  
ROTHERHAM  
RICHARD J. LOVELL, Architect. AD 1894

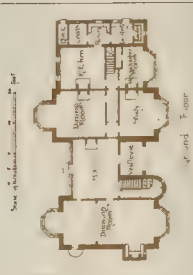






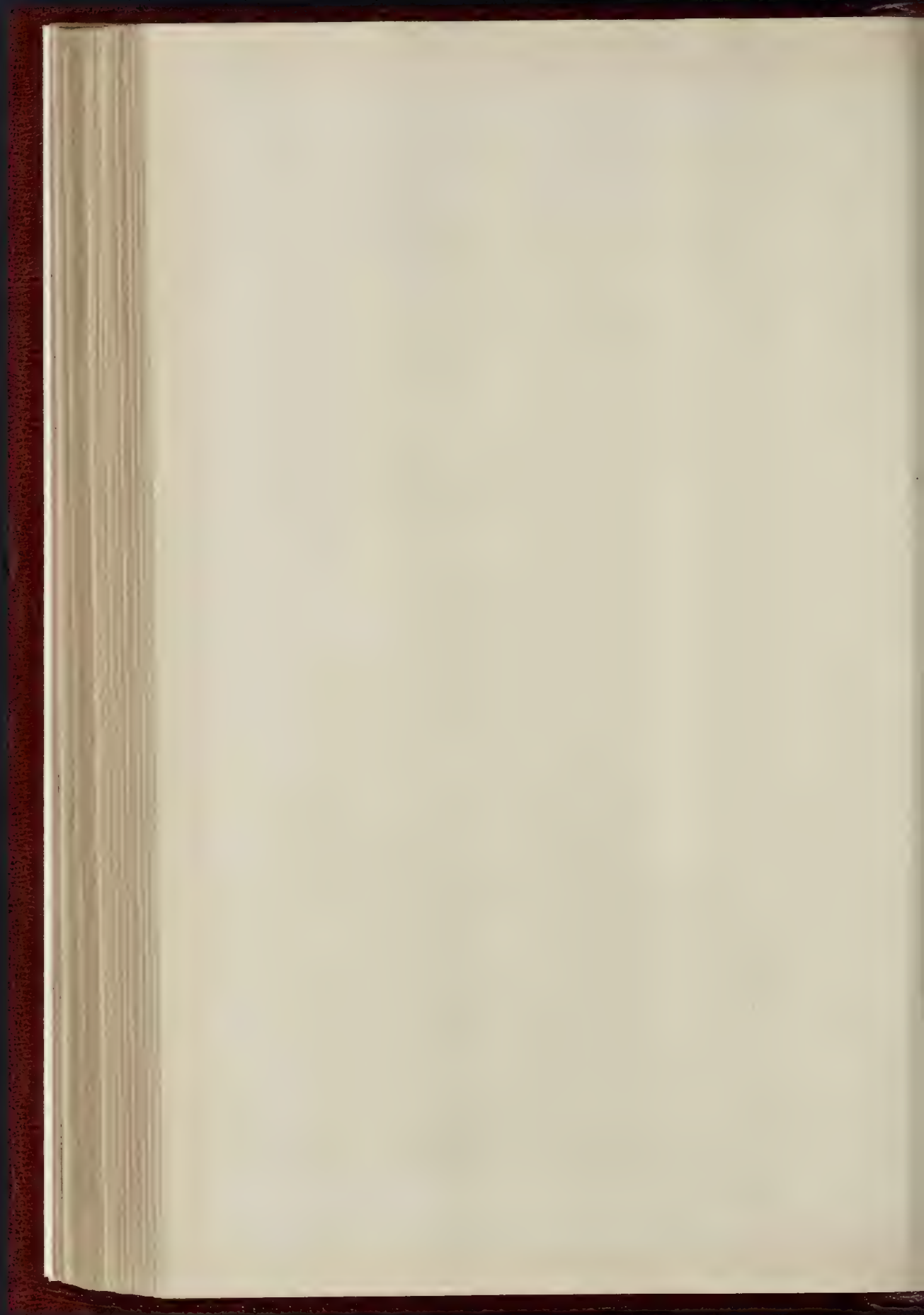
THE BUILDER, SEPTEMBER 29, 1894.

House for the Hon. A. L. York, of Hampton  
Entrance Front. R. A. Briggs, Esq.







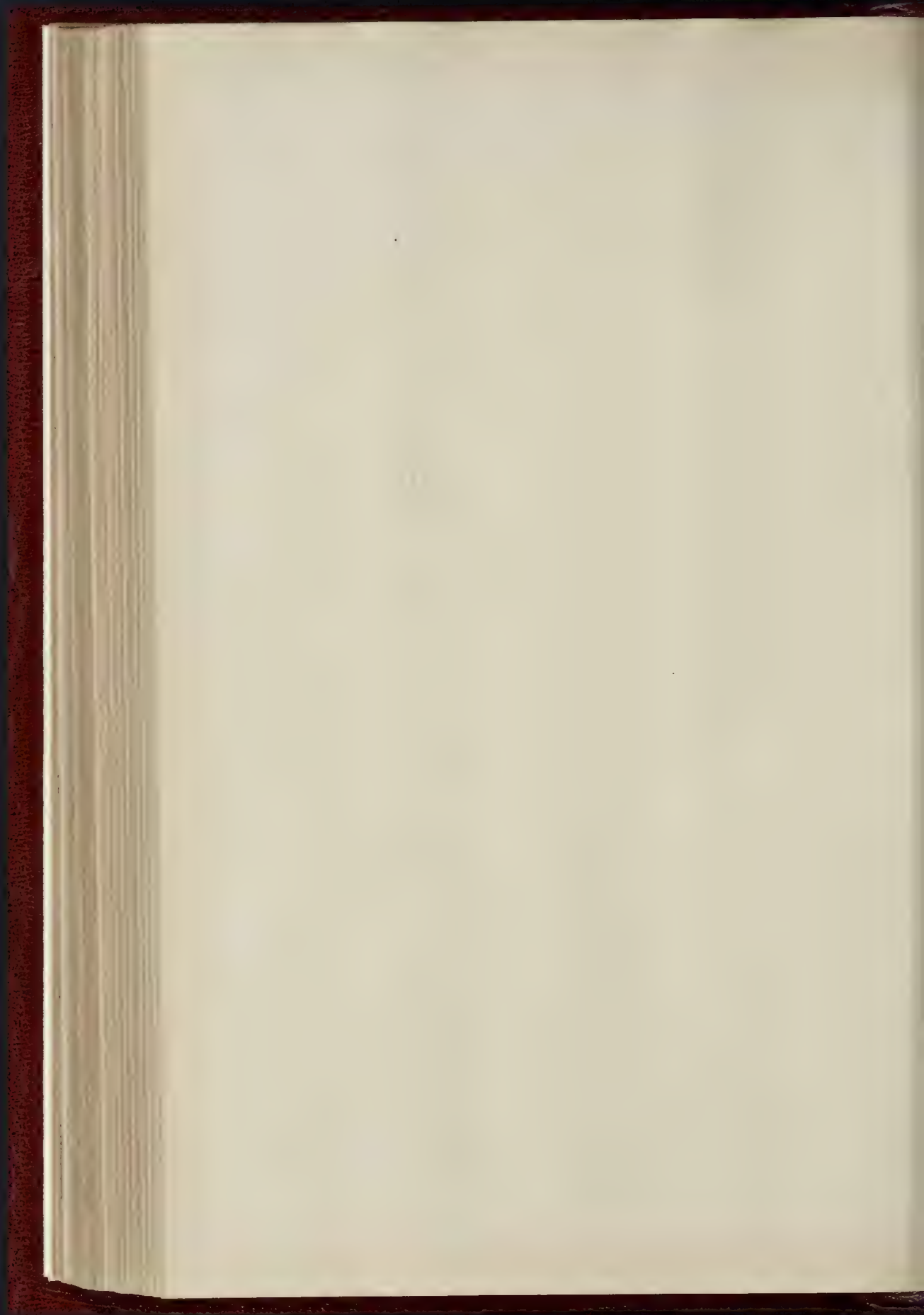




A. PORTION of the NEW SCHOOL BUILDINGS.  
 -TONBRIDGE - KENT -  
 of Church of St. Andrew  
 27 Bedford Row, London W.C.



PLAN - TWO SQUARES 100' 4" 100' 4" EAST-WEST STREET - SETTER - AND 10'







Municipal Buildings, Rotherham.—First Floor Plan.

ADDITIONS TO TONBRIDGE SCHOOLS.  
The only portion of the original fabric of the Grammar School at Tonbridge, founded by Sir Andrew Judde, Kt., in the year 1553, is now incorporated in the head-master's house. The old school-buildings were taken down and the new erected in the present position in 1863, by the Skinners' Company, who are the Governors of the school.  
Science laboratories, Art rooms, and library, were built in the year 1886, at the north end of the school-grounds, and so placed that a future extension of the building would connect the two. Such extension has lately become necessary owing to the rapid increase in the numbers of the school under the able head-mastership of the Rev. Joseph Wood, D.D. The large school of 1863 being totally inadequate for the accommodation of boys and visitors on speech day and other occasions, it was determined to build a new one capable of seating over 500 persons. The illustration shows the external view from the playground. The interior has a massive hammer-beam roof in oak, and a panelled oak dado on all sides 9 ft. high. A large platform for use on "Skinner's Day," and two small retiring rooms are provided, and a large recess is also arranged for as an organ chamber. The new block of buildings connecting the existing portions above mentioned, contains 12 class-rooms, each 24 ft. by 20 ft. The basement will be used as wood and metal workshops, and the top floor as studies, porters' rooms, &c., and new masters' common room, 26 ft. by 24 ft., is also provided in the large tower, which forms the central feature in the façade with a dormitory, ver, and music and practising rooms on the top floor.

The whole of the elevations are faced with the local Southborough stone, and the design has been carried out in the spirit of Late Gothic work, harmonising as far as has been thought expedient with the building of 1863.  
The cost of the present buildings, together with the alteration of levels to playgrounds, &c., will be about 23,000*l.* Mr. Campbell Jones, Surveyor to the Company, is the architect. Messrs. Strange & Son, of Tonbridge Wells, are the general contractors, and Mr. W. H. Ferguson is the clerk of works.  
The new buildings are approaching completion, and will be formally opened next month.  
MUNICIPAL BUILDINGS, ROTHERHAM, YORKS.  
THIS is a reproduction of a perspective drawing of these buildings which was exhibited in the Royal Academy this year. The present buildings of the Corporation have been partially utilised, and the parts of the old buildings remaining are indicated by hatched lines on the plan.  
All the police offices, cells, courts, &c., on the ground floor, are new, and the fittings have received special attention so as to make the buildings as complete as is possible.  
The entire elevation to the right from the entrance is new, together with the tower, pediment, cornice, &c., and the whole of the first floor, except the five circular-headed windows on the left.  
The entire arrangement of the ground floor is also new, and all the first floor and other parts with the exception of the large hall and roof over.  
RICHARD J. LOVELL.

COMPETITIONS.  
NEW PARK, BRISTOL.—Mr. Thomas H. Mawson, architect, of Belle Vue Park, Newport (Mon.), has been awarded the first premium in open competition for designs for laying out a new public park for St. George's, Bristol.

Correspondence.  
To the Editor of THE BUILDER.

HOUSING OF THE AGRICULTURAL LABOURER:—THE FEN DISTRICT.  
SIR,—Your commentary upon the Report of the Royal Commission *re* the above subject in the current issue is both valuable and instructive.  
I should like, if you will permit me, to supplement it by adducing some cogent reasons accounting for the usually remote situation of the abode of the agricultural labourer in the district known as "The Fens" from the locality of his employment.  
The district alluded to is unique in England; it has no correspondence in any similar area approaching equal extent elsewhere in the country. It may be described as a tract of country extending from Bedfordshire in the south to the south-west portion of Norfolk, westward of the River Ouse in that county, and terminating at "The Wash."  
Until early in the seventeenth century this was, for the most part, a huge morass, and undoubtedly looked upon as an irreclaimable bog, with here and there a small area above flood level, upon which the natives built their thatched dwellings. In the year 1625 the then Duke of Bedford called in Vermuyden, a Dutch engineer of eminence, who had had experience in dealing with similar "swampy areas" in

Holland, and he devised a scheme for the reclamation of what was then the home of the heron, wild swan, and cormorant.

The duke spent a vast sum in initiating a scheme which, by the development of the subsequent two hundred years, opened out an area which, from the alluvial deposit of centuries, now forms the best corn and root-producing land in England, being drained by those two large artificial waterways, the Old and New Bedford Rivers, and a natural river, the Great Ouse.

Such a district left no option to settlers, and the grouping together of dwellings has never been departed from to any extent, nor is it likely to be, for "ague" is less an enemy on the somewhat higher-levels, access is easier, and a pure supply of drinking-water more readily obtainable.

It is marvellous how the four great masterpieces of architecture—viz., the cathedral churches of Ely and Peterborough, and the Abbeys of Croyland and Thorney, were reared in such a country, where means of locomotion and transport was then so difficult.

The improvement, however, left its mark upon one of the fanes; the settlement of the great north-west tower of Peterborough Cathedral was deemed, by those competent to judge, to be directly attributable to the gradual subsidence of the adjacent land through water drainage.

I might add that, in the Fen district, probably "Thorney Lordship" exhibits the best specimen of comfortable provision for its labouring dependents; and in "upland" country no better example can be advanced than the excellent, comfortable, and roomy residences erected by the Prince of Wales for labourers on the Sandringham Estate.

Undoubtedly the merging and grouping together of farms which has been so general in the Eastern Counties during the last two decades has, to a great extent, done away with the system of labourers living in propinquity to their employment, and the farmer has by demolition of fences, and the removal of other features, increased his producing area to the greatest possible extent, S. S. SAINTY.

#### PAYING DEPOSITS FOR COMPETITION CONDITIONS.

SIR,—I was pleased to see your Note in the *Builder* of August 4th, and Mr. Pite's letter in the 11th August issue, as to paying deposits for instructions. May I ask, in paying these deposits, if, as in the instance of the Halifax and Huddersfield Bank competition, in which it is stated the bank managers or directors (who are to be the sole judges) have no intention of returning the money, except on receipt of designs, whether competitors would be warranted in clubbing together, and making one set of conditions do for a quantity of designs sent in, as evidently the promoters show a covert attempt to make capital from those who lay themselves open in many instances to be duped? I should have obtained the conditions had a reasonable clause, as in the case of the Durham County Council, been inserted in the advertisement asking for designs, stating that the deposit would "be returned either on receipt of a design, or return of documents within fourteen days."

A NON-COMPETITOR.

\*.\* Of course competitors who are known to each other can do as our correspondent suggests, and share a copy of the "conditions" among them, but they would find it very inconvenient.—ED.

### The Student's Column.

#### DETAILS OF RURAL WATER SUPPLY.—XIII.

##### STORAGE OF WATER.

ONE of the most important questions for the water engineer is the determination of the capacity for storage which is to be provided in the impounding reservoir. The purpose of these reservoirs is to maintain a balance between the fluctuations of supply and demand when the rate of consumption is greater than the natural supply at the same period. They should not be too large or expensive, keeping in view the average growing necessities of the population. The average quantity of water required per head of population per day varies according to circumstances. It is generally supposed that it should not exceed twenty gallons in non-manufacturing, and thirty gallons in manufacturing, towns; though in, fact, these quantities ought to be, and will soon be, regarded as minimum rather than maximum limits. The following table gives the variation in the quantity used in fifty-eight towns in the United Kingdom and in fourteen towns abroad. The comparison is not altogether satisfactory, as many of the towns abroad include water used for flushing purposes in the rate consumed per head:—

Table of Water Consumption per Head per Day in various Towns in 1892.

TOWN.	Gallons per head per day.	TOWN.	Gallons per head per day.
Aberdeen .....	60	Huddersfield .....	22½
Abingdon .....	5	Keighley .....	30
Banbury .....	17	Lanark .....	40
Barrow-in-Furness .....	32½	Leamington .....	17
Bath .....	21½	Leeds .....	20
Bedford .....	25	Lincoln .....	21
Birmingham .....	27½	London County .....	29½
Bolton .....	20	East London .....	31½
Bournemouth .....	25	New River .....	28½
Bradford .....	22½	Chelsea .....	34½
Bridgwater .....	16	West Middlesex .....	29½
Burnley .....	22 09	Grand Junction .....	33½
Cardiff .....	21	Vauxhall, South .....	31½
Carlisle .....	22	Lambeth .....	30½
Carnarvon .....	40	Manchester .....	21
Congleton .....	10	Newport, Mon. .....	20
Coventry .....	20	Northampton .....	14
Croydon .....	32	Nottingham .....	18½
Dartmouth .....	12	Oldham .....	20
Darwen .....	27	Pertth .....	39
Derby .....	20	Ripon .....	23
Doncaster .....	20	Salisbury .....	40
Dover .....	26	Sheffield .....	21
Dublin .....	47	Southampton .....	30
Dundee .....	50	Staleybridge .....	21
Edinburgh .....	40	Stratford-on-Avon .....	19½
Glasgow .....	50	Ulverston .....	40
Halifax .....	23½	Warrington .....	20
Hereford .....	30		

Table of Water Consumption per head per day in Foreign Towns in 1892.

TOWN.	Gallons per head per day.	TOWN.	Gallons per head per day.
Bayonne .....	55	Kiel .....	28
Berlin .....	22 9	Linsage .....	22 8
Bonn .....	61	Magdeburg .....	29 7
Boston, U.S.A. ....	76	Marseilles .....	99
Chicago .....	95	New York .....	65
Detroit .....	126	Paris .....	47
Frankfort .....	39	Philadelphia .....	56
Hamburg .....	52	Stuttgart .....	23 8

The consumption having been estimated according to the circumstances existing in the area to be supplied, the rainfall within the proposed catchment basin is then to be determined. In estimating the storage required, the data afforded by any single or average year will not be sufficient. The estimate must be based on a period of years during which the rainfall is below the average. There are several methods for determining the capacity of storage required, some by empirical formulae, others by graphical methods. Extreme care should be taken in adopting empirical formulae that due consideration is paid to the geological and other conditions existing within the catchment area to be dealt with. The late Mr. Thomas Hawkesley, F.R.S., deduced the following formula based upon his extensive experience:—

$$s = \frac{1000}{r}$$

Where  $s$  = the number of days' storage required (which varies from 100 to 250 days).

"  $r$  = average rainfall in inches during three consecutive dry years, the average rainfall for a dry year being taken at five-sixths of that for an average rainfall of a long series of years.

A solution of this question by graphical methods was communicated to the Institution of Civil Engineers in 1883, and a further paper was recently read before the Austrian Society of Civil Engineers by the same writer, Herr W. Kippel, of which the following is a description:—

On an axis of abscissae, the months are laid off for each year of the period under consideration, and the demand of the town in cubic feet or gallons for each month plotted as ordinates, a slightly undulating curve drawn through the points so plotted gives the demand curve. In a similar way the supply curve is plotted, and represents the available rainfall from the watershed. Whenever the supply curve rises above the demand curve, we have a surplus on hand, and when the latter curve rises above the former a deficiency is shown for the period indicated. From such a diagram the surplus or deficiency for each month can be scaled off and used in the construction of a mass curve. The months and years of the period involved are represented abscissae as before; but the ordinate at each month represents the algebraic sum of all the surpluses and deficiencies from the beginning of the period to that point. The mass curve reveals the surplus or deficiency during the interval between any two points on the axis of abscissae, which is represented by the difference of the

corresponding ordinates. An ascending curve shows an increasing, and a descending curve shows a decreasing storage; white crests and hollows show occasions when demand and supply are balanced. A graphical method was communicated to the Liverpool Engineering Society in 1891, somewhat similar to Herr Kippel's method, and has been adopted in several instances with satisfactory results.

#### Impounding or Storage Reservoirs.

The principal factors which determine the position of impounding reservoirs are (1) purity of source, (2) area of catchment basin, (3) quality of available rainfall, (4) altitude and suitability of site, (5) geological structure.

1.—Purity of source, which has been referred to in the earlier papers, is of paramount importance. The most satisfactory area to impound water is where there is a sparse population, scant herbage, and an entire absence of cultivated land. The nearer these conditions are approached, either naturally or artificially, by collecting and diverting the sources of pollution, the nearer will an ideal watershed be realised.

2.—Area of catchment basin is found by drawing a contour line from the proposed site of the embankment along the ridge which form the watershed, or from which the water sheds itself on either side. This may be ascertained from a contour Ordnance map, or by running a contour on the ground and marking it on the map. The land within this line is then measured to arrive at the superficial area.

3.—Quantity of available rainfall has been described in an earlier paper.

4.—Altitude and suitability of site. The height of the source above the highest point of supply can easily be ascertained by an inspection of an Ordnance map, and a simple calculation will determine the available head for supply. The pressure in the district to be supplied should at all times be sufficient to force the water above the higher buildings, and for this purpose an average pressure of 80 to 100 ft. would be ample, and meet all requirements. In exceptional cases the only available catchment area is not at a sufficient elevation to supply the district, and then the water has to be pumped from the impounding reservoir to another reservoir at a higher elevation. The greatest capacity with the least cost is the nearest object to be attained. Where a valley or lake can be utilised the most economical method of forming a reservoir is to construct a dam at the inlet, the most desirable shape (fig. 16A) being where the valley gradually widens out upwards from the dam with only a slight fall to it from the inlet. Such an arrangement would give the greatest capacity with the least cost for embankment, and the uniform depth resulting would prevent the growth of vegetation. Surface springs should be kept clear of the embankment on the inner side if possible, or conveyed outside the reservoir. The materials of which the dam is to be formed will depend upon those which are available on the site of the dam, and will be dealt with in detail subsequently.

5. Geological structure of the area proposed to be utilised for the formation of an impounding reservoir should be exceedingly carefully examined. Too much stress cannot be placed upon thoroughly practical examination by an experienced geologist or engineer who has a practical knowledge of the subject, as a want of sufficient care at the outset may result in a largely-increased cost of construction, or even a subsequent abandonment of the site. The site of the Woodhead Reservoir of the Manchester Corporation had to be abandoned on account of the unsatisfactory foundations revealed after the excavations had commenced. The presence of permeable rocks dipping towards the dam is a source of trouble, and every precaution should be taken to prevent the water from percolating in them. The best method is to excavate to a sufficient depth along the outcrop, and afterwards fill in the trench with puddle protected on the surface with concrete. The permeable strata should also be cut through by the puddle trench of the dam, or the water in the reservoir will gradually escape and rise as springs at a low point in the valley, the quantity varying with the head of water in the reservoir (fig. 1). Mr. Isaac Roberts, F.G.S., records the following observations upon the effect of pressure on the quantity of water that will pass through a square foot of sandstone of average coarseness, 10 ft. in thickness:—

Pressure.	Percolation.
10 lbs. per square inch =	4½ gallons.
20 " " " =	7½ " "
40 " " " =	19 " "

The dislocations produced by faults, and



Fig 16

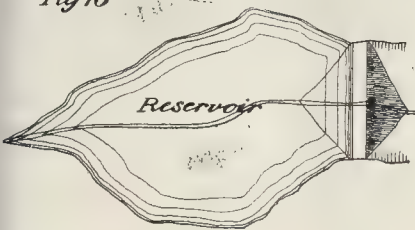


Fig 18

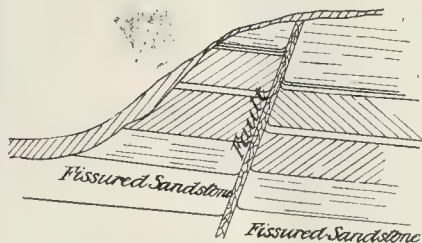


Fig 17

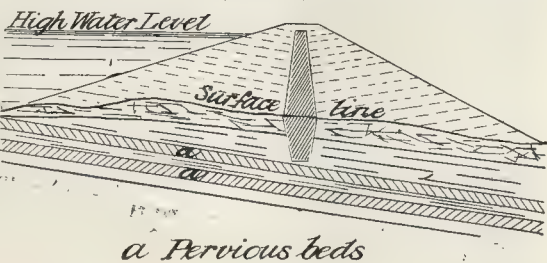
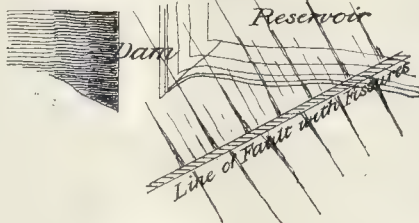


Fig 19



fissures proceeding from them, are also a fruitful source of anxiety. A knowledge of their positions can only be ascertained by trial pits systematically arranged; boreholes should not be relied upon. The fault may be practically an open fissure, as well as a dislocation of the strata, raising a permeable bed to or near the level of an impervious one (fig. 18). The fissures extending on either side are even more difficult to deal with than the fault itself (fig. 19); they frequently occur in the older rocks. The result of such fissures is to convey the water out of the reservoir either by the side of the dam or under it through permeable strata, where it may rise as springs. This entails a serious loss to the impounding works. In exceptional cases the matrix or material between the two cheeks of the fault is composed of fine silicious clay, which forms an effective dam in itself. As an instance of serious results arising from a fissured foundation, where due precautions have not been taken, we may refer to the Holmfrith reservoir, which burst in 1852, on the only occasion on which it was filled. The embankment was constructed on fissured sandstone, and the water gradually escaped through the fissures, washing a portion of the embankment with it. Ultimately the embankment subsided below the weir-level, and a flood occurred completing its destruction.

#### GENERAL BUILDING NEWS.

**NEW POLICE COURTS, ASTON, BIRMINGHAM.**—The police courts and offices erected in Victoria-road, Aston, will be opened on Monday, October 15th next. The building is erected on the site of the old courts and adjoining ground, obtained by the demolition of several houses and cottages. The cells, which were in good condition, have been retained in the new building, which is in the free Renaissance style. The front elevation, to Victoria-road, is of red brick, with rich buff terra-cotta dressings. Two terra-cotta friezes and cornices run the whole length of the building, and these are supported by fluted pilasters with capitals. The upper frieze and cornice is surmounted by a terra-cotta parapet. From the roof, which is covered with important and higher of which is surrounded by the lantern. The heating and ventilation are on a system laid down by Mr. William Key, of Glasgow, and the same as that which has been adopted for the new General Hospital, Birmingham. The architects are Messrs. Mansell & Mansell, of Colmore-row; and the contractor, Mr. John Bowen, of Birmingham.

**GESTINGTHORPE CHURCH, ESSEX.**—On Thursday last this church, which has been under repair for the last seven months was re-opened. The nave arcade which had by the weight of the roof been thrust out of the perpendicular to an extent of 1 ft. 10 in. has been taken down and rebuilt. The timber roofs of the

nave and aisle, which were particularly fine, had been almost entirely concealed by plaster. These have been reframed and refixed. The chancel arch which was filled in has been opened out but the fabric generally has been disturbed as little as possible. A new organ chamber has been built at the expense of Mr. W. E. Oates, of Gestingthorpe Hall. The work, which, owing to the critical condition of the building, involved considerable difficulty, was carried out by Mr. S. C. Parmenter, of Braintree, under the superintendence of Mr. A. Blomfield Jackson, architect, London.

**ARTISANS' DWELLINGS, SHEFFIELD.**—In carrying out the widening of Eyre-street, Sheffield, it has been found necessary to demolish twenty-three houses, and the Corporation will be under the necessity of erecting other artisans' dwellings in lieu thereof, as ordered by the Local Government Board in their provisional sanction. The Corporation have accordingly offered contracts for the erection of seven dwellings on land belonging to them, situate about 200 yards from those to be pulled down.

**JEWISH SYNAGOGUE, LEEDS.**—A new synagogue in St. John's-place, New Briggate, was opened on the 23rd inst. The edifice is of brick with stone dressings, and accommodates 1,000 people. A gallery, ornamented with wrought-iron work, runs round three sides of the interior. The cost of the whole has been about 1,500l. The architect is Mr. W. A. Hobson, of Albion-street, Leeds.

**TECHNICAL SCHOOL, NELSON, LANCs.**—The Technical School section of the Free Library and Technical School, erected by the Corporation of Nelson at a cost of about 12,000l., exclusive of site, was informally opened on the 20th inst. The building, which has its main frontage to Market-street, is situated in the centre of the town, and will ultimately form the south wing of an extensive pile of municipal buildings. The public library will, as soon as possible, be accommodated in the Market-street end of the building. The structure is three stories in height, and on each floor has a central corridor, with the various rooms opening into it, with the exception of the second floor, where the corridor skirts the external wall.

**MISSION CHURCH AND INSTITUTE, ASTON, BIRMINGHAM.**—The foundation-stone of the new mission church and institute in course of erection in Park-street, Aston, was laid on the 20th inst. by the Bishop of Worcester. The buildings are estimated to cost about 4,500l., exclusive of the site, and will comprise a working men's club, gymnasium, and smoking-room.

**SCIENCE AND ART SCHOOLS, SKIPTON.**—The new Science and Art Schools of the Skipton Mechanics' Institute were opened on Tuesday, the 25th inst. They are situated off High-street opposite the Town Hall, and have been erected at a cost of 3,863l., exclusive of the land. On the ground floor is a lecture theatre, preparation room, lavatories, and secretary's room. On the first floor is the science section, which consists of a large chemical laboratory, &c., and on the top floor there are rooms for the study of perspective and architecture, painting, clay-modelling, and elementary art.

**HOSPITAL EXTENSION, BELFAST.**—On the 24th inst. a meeting was held in St. Mary's Hall, Belfast, for the purpose of inaugurating the fund for erecting additional buildings in connexion with the Mater Infirmorum Hospital, Crumlin-road. The site has a frontage of 230 ft. to the Crumlin-road, and is about an acre in extent, the soil being composed of red boulder clay. The *Belfast Newsletter* says that the hospital is designed on the pavilion system, the object being, as far as possible, to obtain an isolation of the wards, and the principal portions consist of three distinct blocks facing the Crumlin-road, the centre one being the administration building, flanked by a pavilion block on each side, that on the east being for males and the west one for females. These pavilions present their gable-ends to the Crumlin-road, and extend backwards and parallel to the east and west boundaries about 145 ft., and are connected on the ground floor only to the administration block by a wide corridor running east and west the entire length of the frontage, forming the main artery, so to speak, through the establishment. Each pavilion will be three stories in height, and will contain two large wards on each floor, provided with two sanitary chambers in towers, which branch off diagonally at the ends, and are separated from them by disconnecting corridors. The spaces formed outside the gable ends by the projections of these towers is utilised for verandahs for the use of convalescents. Each of the large wards is also provided with a ward kitchen and a small private ward containing only one bed. Between these extreme pavilions and the administration block is placed a smaller pavilion, which contains smaller wards and dayrooms for the convalescents. The hospital is planned for 137 beds and eight cots for children, and that for each bed is allowed slightly over 1,300 cubic feet of ward space, and nine feet of wall space, and 100 square feet of floor space, some of the wards containing slightly more. The buildings are to be of red brick-work with stone dressings, and will be heated by steam and lighted by electricity. The principal entrance is to be in the centre of the administration block, which will be slightly more ornamental than the adjoining buildings, and will be surmounted by a statue of the Mater Infirmorum, from whom the hospital derives its name. The architect is Mr. W. J. Fennell, C.E., of Belfast.

**GRAMMAR SCHOOL, HINCKLEY.**—The recently-erected grammar school buildings at Hinckley were opened on the 20th inst. The accommodation, in addition to a main schoolroom and class-room, consists of a dining-hall, lavatory, and laboratory with separate entrance, and playground, &c., adjoining. There is a commodious house for the headmaster, immediately adjoining the school, and the whole is of red brick. The total cost has been about 4,000l. The architects were Messrs. R. J. & J. Goodacre, of Leicester, and the contractors Messrs. W. Moss & Son, of Loughborough.

**ALTAR, ROMAN CATHOLIC CHURCH, NEAR WATERHOUSES, DURHAM.**—There is now being erected in the Catholic Church at New House, Waterhouses, a high altar in the fourteenth-century style of architecture. The *Newcastle Daily Chronicle*



says that the altar-table, nearly a ton in weight, is of one solid block of Carrara marble, carved with passion-flowers, lilies, and roses, centred with rubies, the table being supported by Campan Vert and Jasper marble shafts, with elaborately-carved white alabaster caps and bases, and jewelled annulets. In the centre panel of the frontal is an oil-painting of the dead Christ, in the arms of the Virgin Mary, and at each side, panels of passion-flowers in vases, surrounded with rich-ribbed mouldings of polished alabaster, and filled in white marble. The base of the plinth is of Rouge Malpauquet marble. On the altar-table stands a repoussé and bejewelled tabernacle, surrounded by alabaster work, covered with costly carving, and in front rich Californian marble shafts, with carved alabaster bases and caps, and jewelled annulets. Flying buttresses of carved polished alabaster, independent of the tabernacle, support the Crucifix. On either side of the tabernacle there are arcades filled in with various marbles, Brocatello, Peitor, Bardilla Italian Grotto, Jasper Campan Vert, and Californian. Between the altar-table and the reredos are steps of Forest of Dean stone, by which the throne for benediction, in line with the reredos, may be reached. The throne itself consists of a corbel angel, bearing a scroll with inscription "Venite Adoremus," capped with a marble slab. The niche from which the angel springs is flanked with four Numidian marble shafts, with carved caps, surmounted by a groined canopy bearing angels, pinnacles, and cresting, completed by a pierced crocketed spire rising high up in the centre. The whole of this work and of the reredos is of white Beer stone. Above this, resting upon a moulded base on either side of the throne, are sculptured groups representing the "Dolours of Our Lady," under elaborately-carved canopies. The whole of the altar, &c., is said to be designed by Father Forth, priest of the mission, and executed, under his instructions, by Mr. A. B. Wall, of Cheltenham.

#### SANITARY AND ENGINEERING NEWS.

**ASHLEY DOWN, HORSFIELD.**—New sewage disposal works for this rapidly-increasing district of Bristol are now under construction. The method of disposal for which the works are being arranged is that of the International Company, but some special departures from the usual plan are being adopted, in order to render the effluent the very best obtainable. The works are situated close to the city, and the effluent will join a stream which runs through a thickly-populated district into the Frome. Instead of the original flat-bottomed settling-tanks open to the sun, the sewage will pass through circular vertical upward filtration-pits arranged within a tank-house, so as to be entirely out of sight of the houses near. The tanks are somewhat similar to those in use in Germany, and have already been successfully adopted by the engineer, Mr. A. P. J. Cotterell, C.E. The sludge will be pumped, without emptying the tanks, into covered sludge-pits, whence it will be forced into a sludge-press, being thus completely out of sight from beginning to end of the work, until it is turned into cake. The effluent water will pass over filtration-beds, so arranged that in dry weather the whole effluent may receive double filtration. By these means it is expected that the highest standard of purity will be obtained.

**WATER FAMINE AT LEICESTER.**—The water supply of Leicester is still rapidly diminishing. The *Standard* says that even with a greatly diminished consumption on the one hand, and several auxiliary supplies on the other, the quantity in stock is so small that, unless something unexpected happens, not a drop will be left in stock on October 15. Gangs of men are engaged night and day sinking wells near the river Soar, where it is hoped supplies will be found; and pumping engines are being prepared to force the water direct into the water mains, without filtrations. This water is not expected to be very satisfactory as regards quality, but it seems the only resource left to save the stoppage of the factories. The water from the old reservoirs is getting very bad, on account of the supply being so low. A new reservoir is being constructed near Mount Sorrel, but a long period will elapse before it is available. At a meeting of the town council on the 25th inst. the chairman of the Water Committee stated that, from the engineer's point of view, only seven days' supply of water remained in the reservoirs. They might possibly go on seventeen days without endangering the public health, but that was the extreme period unless heavy rains fell in the meantime. The present scarcity was entirely due to the limited rainfall, which this year had been less than 16 inches, in addition to which the year was commenced with almost empty reservoirs.

**ELECTRIC LIGHTING, FERMOY, IRELAND.**—The Fermoyn Town Commissioners contemplate lighting the town by electricity, and are now making an investigation as to the probable cost of so doing.

**ELECTRIC LIGHTING STATION, DEWSBURY.**—The works involved in the scheme for lighting Dewsbury with electricity are now practically complete. The lighting station in Bradford-road has cost about 3,500*l.*, and consists of an engine-room, boiler-house, and battery-room. The two

dynamoes have been supplied by Messrs. Crompton, of London, a local firm. Messrs. J. & J. Horsfield have put in the boilers. The mains have been laid by Messrs. Siemens Bros. & Co., of London, their contract amounting to 3,856*l.* The area in which the Board of Trade, by their Provisional Order, made it compulsory for the Corporation to lay mains comprises the Market-place, Daisy-bill, Long-causeway, Church-street, Northgate, a portion of Bradford-road, and Wellington-road to the top of Nelson-street. The low-tension three-wire system has been adopted. Mr. W. H. Preece, now the chief electrical engineer to the Post-office, devised the scheme, which, partly under Mr. Preece's own superintendence, and partly under Mr. A. K. Greener, has now almost been carried out. New Bridge, EDINBURGH. On Monday last, at a meeting of the Lord Provost's Committee of the Edinburgh Town Council, Messrs. Cunningham, Blyth, & Westland, C.E., submitted plans of the proposed new North Bridge, prepared in accordance with instructions from the Corporation. The plans were approved, and orders were given to advertise for offers for the work. Mr. Robert Morham, City Superintendent of Works, undertook the preparation of the architectural work in connexion therewith.

**POLLUTION OF THE RIVER MERSEY.**—At the Leigh Police Court last Monday, the Leigh and Tyldesley Local Boards were each fined 20*l.* and costs, and an order made upon them to abate the nuisance within six months, for polluting the river Mersey with sewage from the sewage farms to run into brooks, and thence into the River Mersey, thereby polluting that river. The Mersey and Irwell Joint Committee prosecuted. The magistrates strongly intimated that both Boards had not attended to their duties. *—Liverpool Daily Post.*

**BRIDGE, WYLLAM, NEAR NEWCASTLE-UPON-TYNE.**—The extensive alterations and improvements to Wyllam Bridge have recently been brought to a satisfactory completion. The new superstructure which has been placed upon the original strongly-built stone piers consists of steel plate girders with a decking of creosoted pitch-pine planking, 6 in. thick, laid at right angles across and overhanging the main girders, whilst on the upper surface is a layer of tar concrete paving. The clear width of the old roadway between the hand-rails, which are of iron with wood panelling in the two lower rail spaces, was about 11 ft., but this has now been increased to 14 ft. 6 in., the passage of vehicles being thereby greatly facilitated, besides adding considerably to the public comfort and safety. The contract was let to the Stockton Forge, Limited, Stockton-on-Tees. The engineers were Messrs. J. Watt, Sandeman, & Moncreiff, and Mr. George Bell, of Collingwood-street, was the clerk of works.

#### STAINED GLASS AND DECORATION.

**WINDOW AT WINKLEIGH CHURCH, DEVON.**—A rich stained-glass window has just been inserted in the parish church of Winkleigh. The subject represented is Abraham entertaining the angels, and the inscription at the base reads:—"To the glory of God, and in loving memory of George Luxton, born 1832, died 1883." The artist is Mr. F. Drake, of the Cathedral Close, Exeter.

**MEMORIAL WINDOW, BANGOR, N. WALES.**—On the morning of the 23rd inst., a stained-glass window was unveiled in St. Mary's Welsh Church, Bangor, to perpetuate the memory of the late Lord Penrhyn. It occupies a position in the eastern portion of the church, and has been prepared from the designs of Mr. Wyndham Hughes, Birmingham, who assisted "The Nativity" as the subject of the illustrations. The picture is framed with canopy work, in which there is a representation of "The Annunciation." The cost of the whole was 170*l.*

**DECORATION OF BISHOP RYDER'S CHURCH, BIRMINGHAM.**—This church, which has recently been extensively decorated, was reopened on Saturday, the 22nd inst. Amongst other new works the chancel arch is ornamented with spiral foliations in colours and gold. The spandrels on either side of the chancel arch are enriched by representations of glorifying angels with trumpets, painted on a gold ground, and the decoration of the chancel itself is rich and elaborate. On either side of the east window are painted, under canopies, adorning angels on gold grounds. Many of the nave windows have been filled with stained glass. The builder's work was carried out by Mr. John Bowen; the decorations by Mr. W. Naughtin, from full-size designs and under the superintendence of Mr. W. H. Bidlake, architect, of Waterloo-street, Birmingham; and the figures were painted by Mr. G. T. Tarling.

**MEMORIAL WINDOW, WIGAN.**—A stained-glass window has been erected in the parish church of Wigan, to the joint memory of General Sir John Sir James Lindsay, K.C.B., and of his wife, Lady Sarah Elizabeth Lindsay. It consists of four figures, representing Mercy and Truth, Righteousness and Peace. Messrs. Heaton, Butler, & Bayne were the designers.

**WINDOW, ST. ANN'S CHURCH, BRADFORD.**—We learn that a large stained-glass window will shortly be erected in St. Ann's Roman Catholic Church, Bradford. It will be a double one, with six lights, and is estimated to cost about 160*l.*

#### FOREIGN AND COLONIAL.

**FRANCE.**—The technical studies of the Metropolitan Railway of Paris are over, and it is thought that the Minister of Public Works will be able to draw out the bill on the Bureau of the Chamber of Deputies by the 15th November. In this bill the State claims no money, it demands only certain lands, and the abolition of all taxes on transports. There are already 327 competitors for the 1900 Exhibition. The Government have just commissioned the sculptor, Constant Roux, to execute a marble bust of General de Lamoricière for the Government House at Algiers. It has also ordered a marble bust of Marshal Pelissier, to be executed by the sculptor Léon Roussel, and placed in the Mustapha Palace, near Algiers. The exhibition of the Society des Amis des Arts, at Nantes, will open on the 1st February, and will remain open till the 28th. The vestiges of a Pagan Temple have been discovered at Saint-Similien, near Nantes, on the site of the church, together with some stone coffins, various ornaments, and even some remnants of clothing. The municipality of Douai are shortly going to undertake some important works, the expense of which is estimated at one million, four hundred thousand francs. The works are to include the demolition of the fortifications inside the Paris and Valenciennes gates, and the making of a public park near this latter gate. The erection of a monument to Meissonier has just been begun at Poissy, on the Place de l'Eglise. The inauguration is to take place at the end of October. A magnificent hospital, given by M. Schmeider, director of the "Le Travailleur" Metallurgique at Creusot, has just been inaugurated in that town.

The sculptor Alfred Boucher is executing at Aix-les-Bains the bust from life of the Grand Duke Alexis. In excavating at Vienne, on the site of the old "Palais du Miroir," two fine marble statues have been discovered. They are both Roman, 12 metres high, and it is thought it represents the One, in a perfect state of preservation, and the other, "Dea Roma." At its feet is a helmet. The other statue, of which the head has not been found, is that of a young girl. The marble of which the two are carved is of remarkably white tone and fine grain. At Dreux, a few days ago, the old castle kept, in which is preserved the furniture formerly belonging to King Louis Philippe, was damaged by lightning. On Sunday, September 30, is to take place the inauguration of the monument erected at Mont-sous-Vaubrey to M. Jules Grévy. The monument is composed of a pyramidal pedestal in Jura stone, surmounted by a bronze bust of the former President of the Republic, by M. Carrier-Belleuse. It is announced that the municipality of Lyons intend to acquire, at the price of 150,000 francs, the immense painting by M. Roybet of "Charles le Téméraire dans l'église de Nesle," exhibited last year at the Old Salon, and which procured for its author (rather to the surprise of many critics) the Grand Medal of Honour of the Salon. The death is announced of M. Eugène Delahaye, editor of the journal *La Revue des Beaux-Arts*, at the age of fifty-eight. A financial society proposes to construct, in Paris, a large hippodrome, to be built of piles between the Pont Neuf and the two arms of the Seine. The floor would be on a level with the statue of Henri IV., and the entrance from the Pont Neuf.

**GERMANY.**—Some interesting particulars of the career of Professor Reusch, the sculptor of the Königsberg Emperor William monument, are published in the *National Zeitung*. Born in 1843, at Siegen he came to Berlin in his nineteenth year, where he entered the Academy of Art and secured several prizes. In 1872 he won the Michael Beer studentship by his "Awakening of Lazarus," which enabled him to study for two years at Rome. On his return to Berlin he was very active, his chief works being the war monuments at Siegen and Bensberg, and the statuary for the Ministry of Commerce at Berlin, for the Belle-Alliance Bridge, and for the Criminal Courts at Moabit. His "Demon of Steam" attracted much favourable attention at the 1880 Art Exhibition. In 1881 he was appointed to Königsberg, where he was the author of a number of groups and statues for the Königsberg Government offices, as well as of several historical busts and monuments. At present he is engaged on an equestrian statue of the late Emperor William for South German town. Traces of a Roman camp at Cannstatt, near Stuttgart, the former existence of which has long been taken for granted, have been discovered by Dr. Kapff in the meadows known as "Auf dem Staig." The north-eastern angle has been laid bare, and further excavations are being undertaken by the Imperial "Limes" Commission. In the competition held under the auspices of the *Vereinigung Berliner Architekten* for the designs of a large building on a plot between the Leipziger Platz and the Voss-Strasse, Berlin, the first premium of 150*l.* was awarded to the Ludwig Engel. Yet another plan has been handed in to the Municipality for improvement of communications in Berlin—viz., a suspended electric railway, on the Eugen Langen system. Messrs. Siemens are about to start work on the electric tramway between Gesundbrunnen and the "Pankow" although certain legal details have still to be settled. The fountain, designed by the sculptor Uechtritz, for design of which was acquired for Berlin, is being



east, and will be set up in the Rosenthalstrasse. —It is proposed to build a new church and vicarage in the Brandenburg Vorstadt at Potsdam at a cost of about 18,000*l.* Of this sum the community will contribute 10,000*l.*, and it is expected that the Emperor will grant the rest. —Herr Paul Wolff, the architect of the new Imperial Houses of Parliament at Stockholm at the invitation of the Swedish Government, to report on the much-contested plan to erect new buildings for Parliament and for the Royal Bank on the island of Helgeandsholmen in that city. —Excavations at Fürstheim, near Mayence, undertaken under the direction of Professor Wolff, of Frankfurt-on-Main, have resulted in the discovery of the walls of a Roman house dating, presumably, from about 50 A.D.

AUSTRIA.—An exhibition in connexion with the Congress of Natural Historians was recently opened by Herr von Madeyski, Minister of Education, at the Vienna University. Among the exhibits are a great number of views and plans of the State of Austria, as well as an international collection of designs for crematoriums.

RUSSIA.—The Ministry of Communications has granted a concession to an American Syndicate to build a large engine factory in Russia, and has given an order there for thirty locomotives. This is the first time for a considerable period that permission has been given to a foreigner to enter into industrial enterprise in the country. The foundation-stone of a cathedral for the orthodox faith was laid at Warsaw with much ceremony on the 12th inst., the Czar's name-day. —Traffic for passengers has been opened between Omsk and Tebeljinsk, the most western section of the Great Siberian Railway. —The successful conclusion of the Commercial Treaty with Germany has led to proposals for a railway line across the frontier, which, according to the *Neue Zeitung*, are now being considered by the Government.

SWEDEN.—A new town hall is in course of erection in the city of Helsingborg, on the Sound, with a huge tower, but some while ago it was discovered that the latter leaned considerably out of the perpendicular. The work was then stopped, and a commission appointed to consider the matter.

This body reports that owing to the defects of the two western piers on which the tower rests they are now supporting the structure to the extent of 70 per cent., the two eastern piers receiving only 30 per cent. of the weight. They are, however, of the opinion that no further subsidence will take place in this corner, and that the erection of the tower may safely be continued. The Sulphite Factory at Storvik has been rebuilt, having been burned down in February, 1893. The former buildings were entirely built of timber, but nearly all the new ones are of stone, the woodwork being protected by "Gipsdielen," a fireproof substance produced in Germany. The work of re-erection has only occupied six months, a remarkable short space of time in Sweden. The cost of the new buildings is 800,000 *kr.* They have been designed and carried out by Herr V. Folin, Civil Engineer. —The Building Committee of the great Industrial Exhibition to be held in Malmö in 1896, has been constituted, but in the local press some comment has arisen as to the absence of the name of the City Architect, Professor Klein, from the list of members. The exhibition buildings will be erected in the "Höstgatan," a meadow which is to be turned into a park, and when the exhibition is over, the erection of a city museum on the site is contemplated. The park is therefore to be called the "Museum Park." The covered area of the exhibition buildings will be about 10,000 square metres, and the cost about 165,000 *kr.*

NORWAY.—For the last two years Government proposals have been before the Storting to erect a block of new Government offices in Christiania on a site belonging to the State. Designs have been invited, and three accepted provisionally—i.e., one by Herr H. Bull and Herr H. Fjell, jointly, one by the latter alone, and one by Herr Lenschow—all prominent Norwegian architects. Herr Bull is at present entrusted with the erection of the new National Theatre in Christiania. Of these designs, that of Herr Lenschow is undoubtedly the most imposing, but it is, on the other hand, the most costly. Herr Bull suggests a plainer structure, perhaps in more harmony with the unpretentious official buildings in the Norwegian capital. The undertaking will be of its kind ever entered upon in Norway. The cost of the building in complete state being estimated at upwards of 4,000,000 *kr.* It is expected that the coming Storting will vote the first instalment towards it. —A committee has been appointed by the Corporation of Christiania to formulate a scheme for the building of a new town-hall. It consists of four members, one being a member of the State, one Herr Schirmer, the well-known architect, and one master builder. —The large new allegorical group in the pediment over the facade of the Christiania University has been unveiled with great ceremony. It is executed by Herr Skeibrok. —We illustrated last week a villa to be built on the island, Næson, for Herr Folke Zettervall, a Swedish operatic singer, by Herr Folke Zettervall. Herr Hagman has now commissioned another Swedish architect, Herr Ostermann, to prepare designs and plans for a new substantial residential mansion to be built

on the mainland. Herr Ostermann was awarded a gold medal at the Paris Exhibition, mainly for his theatre projects. —A building for business purposes has been added to "modern" Christiania. The facade is very effective, the lower portion being faced with polished white Norwegian marble, and the upper portion with red polished granite. —One of the most imposing buildings ever erected in Norway is the Grand Central Masonic Lodge, just completed in Christiania. It is situated in close proximity to the Houses of Parliament, and opposite to the Royal Palace, the new theatre, &c. The building consists of two separate parts, one for the sole use of Masons, and the other for the public. In the latter there is a large restaurant and verandah, with dining-rooms, private assembly-rooms, &c., and in the Masonic section are eight spacious halls for the various grades of the order. Throughout the entire interior practically no other material than marble has been employed, in all colours. The designer of this "marble palace," as it is styled by Christiania journals, is Herr H. Nissen, a leading Norwegian architect.

#### MISCELLANEOUS.

FONT, ALTRINCHAM.—A new memorial font has been placed in the church, executed by Messrs. J. & H. Patteson, Manchester. It is of octagonal form, and in Derbyshire alabaster, the basin being supported by a column of red Devonshire marble, with carved capitals.

SOCIETY OF ENGINEERS.—The Council of the above society has elected Mr. Perry F. Nursey, a Past President, and for thirty-six years a member of the society, as honorary secretary and treasurer, in place of the late Mr. Alfred Williams, who had occupied the position since the foundation of the society in 1854.

THE DRAINING OF THE ZUYDER ZEE.—The draining of the Zuyder Zee is now definitely decided upon. It is expected that the great work may be accomplished in thirty-two years, at an expenditure of 25,000,000*l.*, and a gain in land, &c., of 25,100,000*l.*

A NORWEGIAN BRONZE.—The Museum of Antiquities in Christiania has just received an interesting find, viz., the largest bronze vessel yet discovered in Norway. These bronze vessels date from the great tribal changes of abode in the seventh and eighth centuries before Christ. They are mostly found on the west coast of Norway, in burial chambers. The vessel discovered exceeds in dimensions any hitherto found, its diameter at the lip being 87 centimetres, the circumference at the rim 272 metres, and the greatest circumference at the bottom 3 metres. The height is, however, small, only 43 centimetres, as is the case with these vessels.

DISCOVERY AT LINCOLN CATHEDRAL.—A most interesting discovery has just been made in the morning chapel of Lincoln Cathedral. It has been found that the existing floor is not the original floor of the chapel. The *Nottinghamshire Guardian* states that the old altar step has been laid bare, and this will be allowed to remain, the floor being relaid on the original level. The foundations of a large buttress were also uncovered, with traces of a wall to the north and another to the east, and it is probable that they formed the boundary walls of a Norman chapel which stood on the site prior to the date when the aisles of the nave were narrowed. There has also been brought to light a gravestone, supposed to be Saxon, but having about it certain Roman characteristics. On the face of the stone are two crosses, one within the other, and round the edge is a cable moulding. The moulding, however, does not extend to that part which would be placed in the ground when the stone was set in position.

NOTTINGHAM ART GALLERY.—An exhibition of the works of Cornish painters, of Newlyn, St. Ives, Falmouth, &c., has been opened at this gallery. The private view was fixed for Friday this week. ARCHÆOLOGICAL AND ARCHITECTURAL SOCIETY OF DURHAM AND NORTHUMBRIA.—The fifth meeting of this society was held on Thursday, the 20th inst., at Guisborough, Grey Ayton and Newton. Guisborough, it may be noted, is the site of a once important monastery of Augustinian Canons, founded, most probably, in 1119, by Robert de Brus. The remains of the church still comprise many portions of extreme beauty, and show that it must have been among the finest of the many splendid examples of Medieval church architecture in which Yorkshire is so rich. The history was related by Mr. William Brown (editor of the *Guisborough Curatorial*), and the architectural features explained by Mr. Hodges. The parish church was visited, which is placed the very remarkable "Brue Tomb."

#### CAPITAL AND LABOUR.

TERMINATION OF THE BOLTON LOCK-OUT.—The lock-out in the Bolton building trade, which has lasted for three weeks, terminated on Monday last. The masters were forced to lock-out men to the number of over a thousand in order to settle disputes in the stonemasons' and plumbers' branches, as already announced in our columns. The operative stonemasons did not object to machinery, but wanted to restrict the working hours of the machines. They, however, withdrew this, and the plumbers

have withdrawn their objection to the employment of book-keepers under twenty-one, but they insist on fining two employers in one case 2*l.* The shops were opened on Wednesday, the plumbers' dispute being left for the masters to arrange.

#### MEETINGS.

SATURDAY, SEPTEMBER 29.  
*Glasgow Architectural Association.*—Visit to Linlithgow.

*Northern Architectural Association.*—Visit to Prudhoe Hall: Central Station, Newcastle, 8 p.m.

MONDAY, OCTOBER 1.  
*Society of Engineers.*—Mr. T. W. Baker on "The Utilisation of Town Refuse for Generating Steam." 7.30 p.m.

TUESDAY, OCTOBER 2.  
*Glasgow Architectural Association.*—Mr. W. Fraser on "Planning of Country Houses." 8 p.m.

WEDNESDAY, OCTOBER 3.  
*King's College.*—Distribution of Prizes in architecture, by the Carpenters' Company. Professor Banister Fletcher on "An Architect's Rambles amongst London Buildings." 7.30 p.m.  
*Builders' Foremen and Clerks of Works' Institution.*—Ordinary meeting of Members. 8.30 p.m.

#### RECENT PATENTS:

##### ABSTRACTS OF SPECIFICATIONS.

15,795.—SYPHON WASTE PREVENTERS: *M. Syer.* The object is to form an air trap in the flush pipe, so that the water in the cistern may be retained until the confined air is allowed to escape either by means of the self-closing push fitted in the down pipe, or by raising the cover in the cistern. Mechanical means of accomplishing this end is described in the specification.

15,865.—ROOFING TILES: *C. Manchip.*—Relates to tiles made by hand or machine from clay, which are punched, pierced, or marked at one operation by a long bar with punches attached. Here the bar has the punches attached, also the markers or guides, and the marking, punching, and cutting is done at one operation.

16,190.—GREENHOUSE GLAZING: *C. Osborne.*—To obviate the use of wooden or metal supports over the framework of the building, iron wires are strained to form the supports for the panes, which are held firmly in place by clips of wire bent so as to firmly grip them. It is claimed that this is lighter, more durable, and very economical.

17,746.—FLUSHING WATER-CLOSETS: *C. Horton.*—This is a double water-closet cistern which is flushed automatically at intervals by means of an oscillating flushing tank worked by trickling water. It first flushes one side and then the other as the water fills the rocking receptacle.

16,625.—WINDOW FASTENING.—*H. Vietig (Lubeck).*—The device for fixing the window consists of a crosswise-supported bar hinged or pivoted and connected at one end with an eccentrically supported lever clamped in an S-shaped guide-piece, and actuated by any movement of this lever.

9,771.—WATER-WASTE PREVENTER CISTERNS: *T. Aitken.*—In the body of the cistern is fixed a simple pump with the shorter end widened and on either the inside or outside of which works a lifting bucket or plunger for the purpose of charging it.

12,233.—CONCRETE PAVEMENTS: *A. J. B. Ward.*—The squares or patterns are made in lead moulds, into which the concrete is afterwards filled; this provides a non-slipping surface.

13,354.—DIES FOR FLANGED TILES: *M. Hareyck (Warschau, Russia).*—An improved press-mould for the manufacture of Dutch tiles and other stove parts provided with flanges. The purpose is to make such articles from powdered materials by exposing the latter to such pressure and in such a way that the body or tile proper is pressed but once; the flange is pressed twice to ensure solidity.

13,593.—CHIMNEY COWLS: *E. W. Lovegrove.*—The improved cowl is formed with a head or horizontal arm with a vertical blade fixed to it which ensures its head being kept pointed away from the wind in whatever part it may be blowing. This head is divided into two parts of its length into two passages, one leading from the chimney, the other opening into the atmosphere, both passages meeting near the end of the head. The open end of the air-passage is pointed toward the wind, so that a current of air will pass through the cowl when any wind is blowing, and will draw up the smoke from the chimney.

##### NEW APPLICATIONS FOR LETTERS PATENT.

SEPTEMBER 12.—17,185, C. Steel, Device for connecting and detaching lines used for Window-closets, and other Sliding Frames.—17,208, F. Lenders, Composition for forming a substitute for stone, marble, plaster, &c.—17,221, J. Rueben, Fireproof Ceilings.

SEPTEMBER 11.—17,222, F. Hayes, Wood-block Paving and Pavements.—17,228, J. Spear, Apparatus to stop the noise of the inrush of water to Water-closet Tanks.—17,243, J. Questier, Glazing greenhouses, railway-stations, &c.—17,276, J. Knittel, Hinges.—17,282, J. Hambley, Kilns for burning bricks, tiles, drain-pipes, &c.—17,249, E. & F. Baller, Door Latch and Bolt combined.

SEPTEMBER 12.—17,356, Craven, Dunnill & Co., Ltd., and F. Pitt, Manufacture of Tiles.

SEPTEMBER 13.—17,403, B. Cochrane, Bricks.—17,427, H. Foot, Hinge, applicable also as a Fastener for Doors.—17,429, W. Cliff, Water-closets.—17,437, C. Clod and W. Mardon, Jan., Door Fastener.

SEPTEMBER 14.—17,467, J. Fagan, Flushing Cisterns for Water-closets.—17,480, P. Lyle, Glazing Bars or Astragals for Roof-lights and Windows.—17,487, G. Skinner, Paint-spraying Appliances worked by Compressed Air.—17,499, F. Woodford, Chimney Cowls.—17,522, W. Crombie and others, Mortice Bolts.—17,544, E. Tessen, Compounds for Destroying or Removing Old Paints.

SEPTEMBER 15.—17,597, W. Lake, Apparatus for Making Mortar.

##### PROVISIONAL SPECIFICATIONS ACCEPTED.

9,777, J. Potter, Screw-drivers.—11,073, J. Stow, Preparing Concrete.—13,529, W. Matthews, Combination Inlet and Outlet for Baths and Lavatories, &c.—13,810, E. Kendall, Window-sashes.—14,308, A. Carey, Construction of Buildings, &c., of Skeleton Framework and Cement, &c.—14,950, W. Griffith, Butt and Hinge for Doors and Gates.—15,055, L. Turnock, Window-fasteners.—15,175, M. Bohn, Roofing Tiles.—15,531, H. Diamond, Indicating Device for use in Connection with Doors.—15,729, R. Papineau and C. Beraford, Preservation of Buildings in



## CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tender to be delivered.
*Waterworks. Pipe Sower 3,000 ft., & Berry Head-road	Refruth Local Board Lower Brunswick	H. B. Nichols .....	Oct. 6
Church, Tylvestown, near Tontyrdrip	Local Board	W. H. Widdicombe .....	Oct. 8
Stables and shed, Verdross .....	Campbell's Limited .....	G. E. Halliday .....	do.
Stables and sheds, Hyde Park-road, &c.	Hartgate Corporation	Jenkins & Mar .....	do.
Surveyor's Materials .....	Farley (York) T. C. .....	S. G. Brice .....	do.
Drainage Works, Walsingham .....	Walsingham Waterworks	H. Dancour .....	do.
Drainage Works, Guildford .....	Walsingham Waterworks	Official .....	do.
Road Metal 1,500 tons .....	Royal Surrey County	do.	do.
Works, Arundel-street, Thorpe-road, &c.	H. Spital .....	do.	do.
Road W. Works .....	Leamington	do.	do.
Station Road, Leamington	W. J. Corp .....	do.	do.
Surveyor's Materials .....	Leamington & W. J. Corp.	do.	Oct. 9
*Broken Granite and Granite Spalls .....	Wilton (Wilt.) .....	Jno. Goughen .....	do.
Alterations, &c. to Heating Arrangements	Hackney Vestry .....	J. Loverock .....	Oct. 10
*Public Underground Conveyance .....	Holborn Union .....	A. Savon Snell .....	do.
*Additions, &c. to S. W. Fever Hospital .....	Hackney Vestry .....	J. Loverock .....	do.
Additional to Schools, Colston Juxta-Street .....	W. J. Corp .....	Official .....	Oct. 11
Bridge .....	District .....	Geo Thomas .....	Oct. 12
*Second Part of Proposed New Buildings	Barry U. D. R. Bd .....	Cunningham, Blyth, & Westland .....	Oct. 13
Part Office Savings Bank .....	Edinburgh Corp .....	Official .....	Oct. 15
Waterworks .....	H. M. Works .....	H. B. Brice .....	Oct. 16
*Ferry Station .....	Walsfield Corp .....	C. Brownridge .....	Oct. 18
Additional to Schools, Water-street .....	Birkenhead Corp .....	do.	Oct. 18
Waterworks, Burroughpield, &c.	Nottingham Sch. Bd .....	H. B. Sutton .....	No date
*Durham .....	The Stafford .....	do.	do.
Villa, Landfrieds Wells .....	Moss Widing .....	A. B. & W. Scott Dean .....	do.
Vicarage House, Llandilo, near Aberystwyth .....	do.	Halliday & Anderson .....	do.
Pair Semi-detached Villas, Farnfield, Ashford-le-Stone .....	do.	do.	do.
Two Houses, Elm-street, Newark .....	do.	J. H. Burton .....	do.
do.	do.	W. Gersenthwaite .....	do.

[illegible]

Those marked with an asterisk (\*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv., vi., viii. and xxi.

Case of Fire.—15,936, C. Parsons, Window-fasteners.—16,010, C. Polden, Window-sash Fastener.—16,031, J. Sinclair, Window-sashes. 16,457, W. Cooper, Ranges, &c.—16,462, W. Hodgson, Water-closets.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)  
19,833, F. Diets, Ventilation.—20,616, R. Bowes, Fire  
places or Hearths.—21,218, R. Crosthwaite, Fire-grates.—  
21,378, J. Sherratt and others, Terra-cotta Chimney Tops  
Wind Guards, &c.—21,876, G. Dean, Hoffman's Kiln.—  
22,705, H. Deifies, Window-frames.—15,440, A. Dandridge  
Tunnels.

## SOME RECENT SALES OF PROPERTY ESTATE EXCHANGE REPORT.

SEPTEMBER 11. - By *W. Walton & Co* (at Torquay): "The Windmill Hill and Daison Properties." Torquay, nine plots of f. land, 10 a. 1 r. 9 p. 1,797l.; five plots of f. land, 7 a. 3 r. 6 p., 1,350l.; a plot of land, 2 a. 0 r. 25 p., 1,500l.; Old Woods Brick Works, 8 a. 3 r. 25 p., 3,400l.; several enclosures of land, 17 a. 3 r. 19 p., 2,300l.; Vine Cottage and 3 a. 1 r. 12 p., 675l.; an enclosure of f. land, 5 a. 2 r. 13 p., 1,700l.; the Vine Timber-yard and land, 6 a. 2 r. 3 p., 950l.; two plots of land, 0 a. 2 r. 35 p., 290l.; Vine Cottage and 0 a. 2 r. 25 p., 300l.; the Torre Building Estate

17 a. r. 13 p. 2, 750d.  
 SEPTEMBER 12. — By *Walton & Lee* (at Torquay).  
 "The Upton Estate," Torquay, f. house and o. a. or. 39 p.  
 420d.; numerous plots and enclosures of land, o. a. 3r. 30 p.  
 2,000d.; four plots of f. land, 460d.; enclosures of pasture  
 and orchard, land, o. a. 2r. 1 p. 100d.; two cottages and  
 o. a. 2r. 26 p. 430d.; "The Ellacombe Estate," three  
 enclosures of building land, 5 a. or. 17 p. 1,355d.; moiety  
 of the rental of Market Yard, o. r. 154 155s. 150d.; "The  
 Lincombe Estate," four plots of land, o. a. 2r. 20 p. 1,250d.;  
 a plot of land, o. a. 2r. 33 p. 130d.

SEPTEMBER 13.—By *Worsfold & Haywood* (at Dover).  
 Dover—3, 4, Limekiln-st., u.t. 34 yrs., g.r. 74, 1504.; 1  
 Queen-st., f., r. 504, 9004.; 5, 6, Prince's-st., f., 4054.  
 Charlton, 2, Avenue-rd., f., r. 194, 108, 3104.; Buckland, 7  
 Oswald-rd., f., 2004. St. Margaret's.—East and We  
 Villas, f., 10504.; "Martin Vale Cottage," f., 2604.

SEPTEMBER 13 and 14. By Walton & Lee (at Torquay): "The Coombe Pafford Estate," Torquay (near). F. house and shop, dairy, and 2 a. or. 13 p., 795*l*. The Lummanton Quarries and 12 a. or. 4 p., 1,000*l*. The Etruscan Dairy and o a. tr. 12 p., 355*l*.; Torquay-race-course, 64 a. 2 r. 32 p., 8,000*l*.; numerous cottages and land, 10 a. 3 r. 19 p., 3,50*l*.; numerous enclosures building, fruit, and accommodation lands, 110 a. 3 r. 20 p.

SEPTEMBER 17.—By *Henry & Latchford*: 44, 46, St. Luke's-rd., Clapham, u.t. 89 yrs., g.r. 25 $\frac{1}{2}$  l., r. 1, 700  
42, Mayflower-rd., u.t. 88 yrs., g.r. 10 $\frac{1}{2}$  l., r. 50 $\frac{1}{2}$  l., 45 $\frac{1}{2}$  l.  
By *Thomas, Pejer, & Miles*: "The Marlborough  
Brewery," Marlborough, with plant, residence, and eight

SEPTEMBER 18.—By *Wagstaff & Warman*: 20, 22, Highbury Park, u.t. 68 yrs., g.r. 51*h*, r. 195*h*, 1,650 lbs.; 112, 114, Bemerton-st., Barnsbury, u.t. 50 yrs., g.r. 100*h*, r. 195*h*, 1,650 lbs. By *Rutley, Son, & Vine*: 77, Mornington-

Regent's Park, u.t. 44 yrs., g.r. 10*l.*, 500*l.*; 57, William-Hampstead-rd., u.t. 28 yrs., g.r. 8*l.*, r. 40*l.*, 325*l.*; 1, Princess-st., Edgware-rd., u.t. 27 yrs., no g.r., 225*l.*—*Humbert, Son, & Flint* (at Watford): "The Grey House"

Alexandra-rd., Watford, L., 3. 700., 1,000.; a plot of land, St. Mary's-rd., 750l.

SEPTEMBER 19.—By *Beadel, Wood & Co.*: Grays, Essex.—“Grays Hall” and 4a. 3r. 39p., u.t. 72 yrs., 25l., 1,400l.; Twelve cottages and plot of land, u.t. 73 yrs. 4l., 1,200l.—By *Humbert, Son, & Flint*: The R

dence, "Antoneys," Pinner, and 10 a. 3 r. 36 p., f., 3,925*l.*; Mary's cottages, West Drayton, f. g. of 3*l.* 12*s.*, reversion in 89 yrs., 85*l.*—By *D. Young*: 8, Park Walk, Brixton, u.t. 187 yrs., g.r. 8*l.* 5*s.*, r. 44*l.*, 325*l.*; 5, Pembury-rd., Clapton, u.t. 55 yrs., g.r. 10*l.*, 400*l.*

SEPTEMBER 20.—By *H. J. Buiss & Son*: 1 to 10, and 13 to

16, Royley-st., Finsbury, u.t. 11 yrs., g.r. 64l., 84ol.; 1 to 19 odd, Palm-st., Bethnal Green, u.t. 38 yrs., g.r. 31l., 105l., 1,400l.; 6, Roman-rd., u.t. 38 yrs., g.r. 3l. 3s., 400l.; 17 to 23 odd, Fellbrig-street, u.t. 36 yrs., g.r. 104l., 400l.; Upper Kennington-lane, Vauxhall, l.g.r. of 30l., reversion in 53 yrs., 800l.—By *D. J. Chattell*: 3, 5, St. John's-ter., Southall, l. r. 65l., 760l.

SEPTEMBER 21.—By *Flood & Sons*: 13, 15, Harrow-rd., Edgware-rd., u.t. 31 yrs., g.r. 8ol., r. 207l., 1,325l.; 8, Netley-st., Hampstead-rd., u.t. 20 yrs., g.r. 1ol. 15s., r. 5ol., 38ol.; 10, Sutherland-place, Westbourne-grove, u.t.

52 yrs. *F. g. i. l.*, *r. 554.*, 380*l.*  
*[Contractions used in these Lists.—F. g. r. for freehold*  
*ground-rent; l. g. r. for leasehold ground-rent; i. g. r. for*  
*improved ground-rent; g. r. for ground-rent; r. for rent;*  
*f. for freehold; c. for copyhold; l. for leasehold; e. r. for*  
*estimated rental; u. t. for unexpired term; p. a. for per*  
*annum; yrs. for years; st. for street; rd. for road; sq. for*  
*square; pl. for place; ter. for terrace; cres. for crescent;*  
*yd. for yard, &c.]*

## PRICES CURRENT OF MATERIALS.

[illegible]

## OIL

Do. and.....	o/y/o	o/y/o	Unseed .....	20 1/2 0	0
Other qualities.....	o/y/o	o/y/o	Cocunut, Coghin .....	25 10 0	0
Cod. ....	1/3	1/4	Do. Ceylon .....	25 0/0	0
Madag. ....	1/3	1/4	Palm, Lagos.....	25 0/0	0
Malagasy, Cuba	1/3	1/4	Rapeseed, English	22 0/0	0
St Domingo,	1/3	1/4	Do. brown.....	22 1/2 0	0
arg. av.	1/3	1/4	Cottonseed ref.....	20 1/2 0	0
Mexican do. do.	1/3	1/4	Do. refined.....	20 1/2 0	0
Tobacco do. do.	1/3	1/4	Do. refined.....	20 1/2 0	0
Huasca do. do.	1/3	1/4	TAR — Stockholm	20 1/2 0	0
Box, Turkey ton	4/0/0	3/10/0	Do. refined.....	20 1/2 0	0
Box Rio, do.	7/0/0	6/10/0	Do. refined.....	20 1/2 0	0
Bahia .....	o/y/o	o/y/o	Do. refined.....	20 1/2 0	0
Satin, St. Do.	o/y/o	o/y/o	Do. refined.....	20 1/2 0	0
mino.....	o/y/o	o/y/o	Do. refined.....	20 1/2 0	0

## TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursday.*]

**ABERCARN**—For the construction of a steel lattice girder bridge, 150 ft span over the River Ebbw, Cwmarn, for the Abercarn and Risca Local Boards. Mr. Geo. Stephens, Surveyor, Local Board offices, Abercarn.

Dempster & Co.....	L772	0	0	T. D. Steel .....	L556	0	0
Baker & Co., .....	622	12	0	American Engineering Co., Abercrombie .....	590	0	0
Iscia Foundry Co. ....	621	0	0	E. H. Page .....	508	4	0
J. Moseley .....	610	0	0	Finch & Co. ....	46	0	0
A. D. Dawney .....	600	0	0				
Galebank .....	594	0	0				

**BARNSELEY.**—Accepted for alterations to schools, Worsborough Common also erection of school buildings, for the Worsborough School Board. Messrs. Senior & Clegg, architects, 15, Regent street, Barnsley.

Massey & Lawton & Sons, Barnsley.....	£1,529	0
Carpentry and Joinery.—Hammerton's Exors, Worsbrough Dale, Barnsley .....	552	9
Plumbing.—J. J. Snowden & Son, Barnsley .....	177	9
Slating.—J. Fleming Barnsley .....	149	10
Plastering.—E. Fleming, Barnsley .....	85	9
Painting.—W. Todd, Barnsley .....	27	0

CARNARVON.—For the erection of a mill at the New Harbour for Mr. J. Prichard. Mr. E. Evans, C.E., 8, Castle-street, Carnarvon:—

Evan Jones .....	£3,610	D. Williams & Son, Carnarvon (accepted) .....	£2,800
Owen Morris .....	3,175		

CATFORD.—Accepted for the erection of a villa residence  
'Davenport,' Davenport-road, Rushey Green, Catford, for M  
l. G. Armfield. Mr. Joseph G. Denton, architect, 77, Edith Gros  
Chelsea, S.W. 1.—  
Charles Watkins, Catford.....£1,450 10

CHRISTCHURCH (Hants).—For additions to Bate Farm.  
Major Stuart Wortley. Messrs. Lawson & Donkin, architects.  
Bournemouth.—  
George & Harding ..... £658 0 | W. J. Chinchin ..... £6:0  
W. Hoare ..... 640 0 | Jenkins & Sons ..... 557  
Estimated ..... 600 19

CROGGAN, MULL (N.B.).—For the construction of a pier, the Argyll County Council. Mr. G. Woulfe Brennan, C.E., Albion street, Oban. Quantities by the Engineers:—

J. & A. McDougall	£1,151	9	0	Pitcairn, McEvoy, &	
G. Mackay & Son	981	1	5	Co. ....	£912 14
J. Adam & Co.	975	0	0	J. Bain ..	894 6
A. McLean	946	19	11		

CROYDON.—For the erection of entrance lodge and stable	
Mason's avenue. Mr. Fredk. West, architect, Croydon:—	
W. Akers & Co.....	£3.773
S. Page.....	3.200
M. Taylor.....	3.026
W. Smith.....	£6.
A. Bullock.....	6.
E. P. Bulled & Co.....	7.

CROYDON.—For the erection of twelve cottages, Sussex-road.  
Mr. Fredk. West, architect, Croydon.

E. P. Bulled, & Co. ....	£2,190	J. R. Bex .....	£1
E. Goulder .....	2,160	S. Page .....	6
W. & P. Hards .....	2,075	A. Bullock .....	1
		£41,055 Croydon 1	

CROYDON.—For the erection of an Iron Temperance  
Mint walk, Croydon Mr W. H. Woodroffe, architect, G  
Dover-street, S.E. Quantities supplied —  
F. Braby & Co. .... £1,460 M. Taylor ..... £

James Smith & Son .....	1,087	W. Harbrow.....
W. Akers & Co.....	1,085	E. Smith*.....
G. E. Bryan & Son .....	1,077	

\* Accepted.



## ILLUSTRATIONS.

The Abbeys of Great Britain.—V., View of Whitby.—Drawn by Mr. J. A. Slater	Double-Page Ink-Photo.
Ground-Plan of Whitby Abbey. Drawn by Mr. R. W. Paul	Double-Page Photo-Litho.
New Monastery and Collegiate Buildings, St. Lawrence's, Ampleforth, York.—Mr. Bernard Smith, F.R.I.B.A., Architect	Double-Page Photo-Litho.
Cartoon for Altar-Piece.—By Mr. G. Woolliscroft Rhoads	Double-Page Ink-Photo.

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### The New London Building Act.—II.



THE first point we come to under the head of "Construction" is the reference to the first schedule appended to the Act, in regard to the structure and thickness of walls, which replaces the "First Schedule" of the Act of 1855. The preliminary clauses are prefaced with a new sentence pointing out specially that the provisions in Parts I. and II. (the principal portions) of the schedule apply to walls built of bricks not of less than ("of not less than," it should have been) 8½ in. long or of stone or other blocks of hard and incombustible substance the beds or courses being horizontal." In regard to the size of the brick it is important to observe that while the minimum length of ½ in. prescribed in the Act of 1855, is retained, the limitation "not more than 9½ in." has been dropped. This sentence is not numbered with the other clauses, and the clause numbered "I." in the preliminary matter is to the same effect as No. I. in the 1855 Act, with the addition of the words "unless otherwise sanctioned," and of a sentence to the effect that open sheds not more than 16 ft. high and not exceeding four squares in area may be constructed of any substances and in any manner approved by the District Surveyor. But what is an "open shed"? We apprehend that there will be differences of interpretation claimed on that phrase. Clause 2 contains the same provisions as the 1855 clause, except that the provision that "no part of the wall shall overhang any part underneath it" is relaxed to the extent of allowing the wall to overhang six inches if solidly corbelled out, and provided that the other side of the wall be carried up vertically. The present Clause 3 is faulty and redundant in wording. Instead of merely saying, as in the 1855 clause, that every stone wall in which the beds of masonry are not laid horizontally shall be one-third thicker than the thickness prescribed for stone walls in the schedule (i.e., rubble or random walls), the new clause reads:—

"3. The thickness of every wall not being built of bricks or stone or other hard and incombustible substances laid in horizontal beds or courses shall be one-third greater than the thickness prescribed in Parts I. and II. of this Schedule."

Why bricks are dragged in, seeing that it is impossible to build with bricks otherwise than in horizontal courses, one cannot see, the more so as the marginal heading gives it "extra thickness of certain stone walls." If that is what it means, the old clause was far more simple and intelligible. And the confusion of meaning is certainly not reduced by the next clause:—

"4. The thickness of any wall of a dwelling-house if built of materials other than those before specified shall be deemed to be sufficient if made of the thickness required by Parts I. and II. of this Schedule or of such thickness as may be approved by the Council."

This is as near as possible to a contradiction in terms. The general (new) preliminary clause states that the provisions of the schedule apply to walls of brick or stone with horizontal courses. Clause 3 tells us that "every wall" built otherwise than so described shall be one-third thicker than the schedule thicknesses. Clause 4 states that walls of dwelling-houses built otherwise than according to the specification in the first clause shall be deemed sufficient if made of the schedule thicknesses, "or of such thickness as shall be approved by the Council." What is to be the legal force of that "or"? By the wording of Clause 4 the building owner or his architect can certainly claim that the schedule thicknesses are sufficient for any materials. The words distinctly convey that meaning. Take the case of concrete walls, for instance. It is evident to any one who understands English that according to Clause 3 concrete walls must be one-third thicker than brick or stone walls, in any building. According to Clause 4 they may in dwelling-houses be of the same thickness as brick or stone walls. (By the existing law concrete walls are to be at least as thick as brick ones of the same extent.) The framers of the Act may have known what they meant, but they have certainly not known how to express it intelligibly. It may be admitted that the existing law is almost equally confused in expression on these points, but the opportunity should have been taken to remedy this confusion of expression, instead of intensifying it.

Clause 5 of the schedule is a new provision (much required) in regard to hollow walls, viz.: That there shall be a wall on one side of the hollow space of the full thickness prescribed by the Act. Clause 6 provides for the measurement of stories as in the present Act, except for the difference (already noticed) that a story shall be

measured from the underside of its floor joists to the underside of those of the story above it, instead of measuring it, as at present, exclusive of the thickness of the floors; the height limit of a "topmost story" is fixed as at present. The present Clause 6, in regard to the height of external and party-walls, is improved (7) in precision of language, and it is important to note that after the words "to the top of the topmost storey" is added the condition "whether the wall is carried to the full height or not." Clause 8, as to estimate of length of walls, is identical with Clause 7 of 1855. Clause 9 (the present Clause 8) as to footings of walls is identical in effect, with the rather absurd addition "unless an adjoining wall interferes in which case the projection" (of footings) "may be omitted where that wall adjoins." How could it be otherwise? A special phrase excludes walls on bressummers from the requirement as to footings; this is necessary, since the "base" of a wall on a bressummer is now defined in the same terms as the base of a wall on the ground.

Two new preliminary clauses, 10 and 11, are added, the first prescribing the method of underpinning, with brick or stone in cement to the full thickness of the old wall, and resting on solid ground or concrete or other solid substructure to the satisfaction of the District Surveyor; the second forbidding the thickening of the wall without notice to the District Surveyor, and prescribing cement and proper bonding.

We now come to the real pith of the schedule—the actual thicknesses required; but it is to be noticed first that while the existing schedule deals first with "Dwelling-houses," and afterwards gives a clause providing that all buildings which are not in either the "Public Buildings" or "Warehouse" classes shall be treated as "Domestic buildings," the new schedule ignores the expression "domestic buildings" altogether, and includes them under the general heading of "Buildings not Public, and not of the Warehouse class." The regulations are not given in the convenient and easily-read form of a table, but are written out at large (not at all an improvement from the architect's and surveyor's point of view), and the order of classification is inverted, the table commencing with the smaller walls instead of with the larger ones, as at present. In comparing the new schedule with the old we must therefore begin at the end of the latter, and work backwards (taking the "Dwelling Houses"

schedule first). The result is as follows, as shortly as we can give it:—

1. A wall not exceeding 25 ft. in height is under the same rules as at present unless (when under 30 ft. in length) it comprises more than two stories, when it must be 13 in. thick below the topmost story. In the case of a story in the roof this may, of course, mean all except about 4 ft. 6 in. of the upper part of the height. The change is a salutary one, and a bugbear to the jerry-builder. In the case of "length unlimited" the rule is as at present.

2. A wall between 25 and 40 ft. in height (the present 30 ft. division is omitted) and not exceeding 35 in length, must be 13 in. thick "below the topmost storey" instead of below the two topmost stories as at present, and for "length unlimited" it is the same as the present rule for a 40-ft. wall.

3. A wall 40 ft. to 50 ft. high, not exceeding 30 ft. in length, must be as a wall of the same height but 45 ft. in length under the present law. For "length unlimited" it is the same as under the present law.

4. A wall from 50 ft. to 60 ft. high must be, if 45 ft. long, the same thicknesses as required for 50 ft. long in the present law; for "length unlimited" it is the same as under the present law.\*

5. A wall from 60 ft. to 70 ft. high, 45 ft. long, is the same as a wall 55 ft. long under the present law; for "length unlimited" it is to be increased in thickness by 4½ in. for every story below the uppermost two stories. In the majority of cases this would come to the same as the present law. This is qualified, however, by a parenthesis—"subject to the provision in this schedule respecting distribution in piers." This is a detailed application of the existing general rule (1855) that "the additional thickness may be confined to piers properly distributed of which the collective widths amount to one-fourth part of the length of the wall."

6. A wall from 70 ft. to 80 ft. high and not exceeding 45 ft. in length is the same as within 40 ft. in length under existing law, except that the 17½ in. wall is to be carried through three instead of two stories. For "length unlimited" it is to be increased in thickness 4½ in. in each story below the uppermost two; again practically the same as the existing law. The provision as to "distribution of piers" applies again to this clause as well as to the following clauses 7, 8, and 9.

7. A wall from 80 ft. to 90 ft. high not exceeding 45 ft. long must be 26 in. thick for the lowest story, 21½ in. for the next, 17½ in. for the next three, and 13 in. for the remainder. For "length unlimited" 4½ in. to be added to each story below the uppermost two. For the shorter length this demands more material than the present law, for the unlimited length rather less, the 26 in. being for one story only instead of two.

8. A wall from 90 ft. to 100 ft. high, not exceeding 45 ft. in length, is nearly the same as one up to 80 ft. long under the present law, except that the 26 in. thickness is only for one story, instead of two. For unlimited length it is increased 4½ in. to every story below the two top ones. This is a rather heavier wall than under the existing law, as the 21½-in. wall runs through three stories instead of two.

9. A wall from 100 ft. to 120 ft. high (the existing law deals with nothing above 100 ft.), and not exceeding 45 ft. in length, commences at 30 in. thick for the lowest story, and the remainder in much the same proportions as before; for unlimited length all stories except the upper two being increased by 4½ in.

The existing provision, that when a story exceeds in height sixteen times the thickness of wall prescribed, the wall shall be increased to a thickness of one-sixteenth the height of the story, is retained, but with the additional condition that the thickness of each external

and party-wall below that story shall be increased to the same extent.

The existing "qualification in case of certain walls"—viz.: that if any external or party-wall is not more than 25 ft. distant (centre to centre), from another external or party-wall to which it is tied by the beams of any floor, "the length of such wall is not to be taken into consideration"—is abrogated, and does not appear in the new Act.

In the schedule for "warehouse walls" the conditions for walls 25 ft. and 30 ft. in height are the same as at present. For 40 ft. in height the thickness of base for 30 ft. in length is extended to 35 ft., while that for 60 ft. in length is restricted to 45 ft., unlimited length remaining the same as at present. For a wall 50 ft. high, the 17½ in. thickness at the base is restricted to 30 ft. in length; the 21½ in. thickness to 45 ft. (it is at present 70 ft.); unlimited length as at present. For a wall 60 ft. high the present 17½ in. is not allowed at all; it must be 21½ in. at the base up to 45 ft. in length (present law 50 ft.); unlimited length as at present. A wall 70 ft. high\* also is not to be less than 21½ in. at the base, up to the length of 45 ft., the 17½ in. thickness for 30 ft. length being abolished; over 45 ft. long it is to be increased 4½ in. up to within 16 ft. of the top of the wall. This exclusion of the highest 16 ft. of the wall from the necessary extra thickness is the same provision as is now made in general terms in the 5th explanatory clause of the 1855 Act as to "warehouse" buildings, only in the new Act it is repeated for each height scheduled. A wall 80 ft. high remains as at present up to 45 ft. in length, above that length the same provision for 4½ in. thickening follows in the same terms as in the last case. Walls of 90 ft. and 100 ft. height are treated on the same principle, the prescribed thickness at the base for limited lengths being as at present, only that the lengths are reduced to 45 ft. in each case, in place of the 60 ft. and 55 ft. respectively of the present law, while the intermediate length of 70 ft. disappears from the schedule. For a wall 120 ft. high the thickness is to be 31 in. at the base up to a length of 45 ft., and beyond that length the extra 4½ in. is applied as before, to within 16 ft. from the top of the wall. Between the heights of 70 ft. and 120 ft. the arrangement is subject to the same provision as to "distribution in piers" as in the case of the other classes of buildings. The explanatory clause as to the method of interpreting the instructions about thickness of warehouse walls (No. 11 in the new Act, No. 5 in the 1855 Act) is the same in effect though improved in wording, with the exception that the permission that in walls of not more than 30 ft. high the upper story wall may be 8½ in. thick is modified by the words "provided that storey does not exceed 10 ft. in height."

The provision as to walls which are less than a fourteenth part of the height of the story, remains as in the 1855 Act, with the provision that "each external wall and party wall below that storey shall be increased to a like extent," as in the parallel clause in regard to buildings not in the warehouse class.

Some explanatory clauses, labelled "Miscellaneous," occur at the close of the schedule as to warehouses. The first of these is a repetition of the "Miscellaneous" clause of the 1855 Act in regard to "cross walls," but with the modification that instead of the phrase "unless it is carried up to two-thirds the height of the external or party walls," we have "unless it is carried up to the floor of the topmost storey." The succeeding provision as to the extent of openings and recesses in a cross wall is the same in effect as at present, only more precisely worded.

A second clause, under "Miscellaneous," provides that "wherever a cross wall becomes in any part an external wall" it shall be treated as such in regard to thickness. This

is, perhaps, desirable in an explanatory sense, though the requirement it makes is legally covered by the definition of "external wall." A third explanatory clause under "miscellaneous" applies the permission as to distribution in piers generally to all cases of walls requiring to be thickened up to one ⅓ in. or ⅓ the height of a story, in the two classes of buildings respectively.

It will be seen that the existing law as to thicknesses of walls for various heights has not been very seriously modified, but that nearly all the modifications are in the direction of increased solidity. Many builders and building owners will grumble at this, no doubt, but we do not think any architects will.

But we cannot imagine why the convenient form of the old schedule, in which the respective thicknesses and requirements could be read at a glance, should have been departed from to put these multifarious requirements in the form of long written-out sentences, from which it is so much more difficult to extract the meaning.

Returning from the schedule to the body of Part VI., we find in Clause 54 the rule for recesses and openings in external walls the same as at present, except that in limiting the area of such recesses and openings the words "above the ground storey" are added—the area of such recesses and openings, taken together, above the ground storey is not to exceed half the area of the wall above the ground storey. (It will be observed that "recesses" and "openings" are now treated together, instead of being treated in almost identical words in separate clauses, which is a desirable simplification.) We presume that the words "above the ground storey" are intended to avoid a special legislation for shop-windows and other such cases; but it must be observed that the wording of the clause, though we may very well guess what it means, does not properly explain itself, and that any one reading the Act by its own light only might very well come to the conclusion that ground stories were forbidden to have any opening. This is a slipshod and careless piece of wording. For recesses in party-walls the provision is the same in the main as at present; the differences are that when the recess is arched over the arch shall be "not less than two rings of brickwork the full depth of the recess;" that recesses formed for lifts are (necessarily) excepted from the condition of being arched over that if a recess is less than 5 in. in depth "corbelling in brick or stone may be substituted for the arching;" and that such recesses are not to come within 13½ in. (instead of "one foot") of the inner face of the external walls. The Superintending Architect (on application) may consent in writing to modification of the provisions as to recesses and openings in any special case where he may think proper. With this we may take the clause (60) relating to "Chases in Party Walls," which is the same as at present, with the addition that no chase shall be made "within 13 in. from an external wall." Does this mean, as in the case of recesses from the inner face of the external wall? so, it should have been so stated; there is room for question as to the reading; and (though the matter is unimportant in itself) it may be observed that the "recesses" clause says "13 in." while the "chases" clause says "13½ in." To find two sentences which are apparently intended to have the same meaning printed with two differences of expression on nearly consecutive pages shows very careless editing. The additional sentence to the effect that "no chase shall be made in a wall of less thickness than 13 in." is only necessary as an explanation for dull intellects, as the provision is covered by the other terms of the clause. What not made equally clear is that the making of recesses or chases on one side of a party-wall must be carried out with due reference to the position of the wall that may be on the other side of the same wall, in order to preserve the prescribed thickness at the back of every part of the

\* The new Act does not use the phrase "length unlimited," but only "exceeding so many feet in length"; but the effect is the same.

\* We put it so for brevity; of course, each height means, as at present, any height between that and the next lowest height scheduled.



chase or recess. The terms of the Act cover this, but it may not be obvious to the duller apprehension, which is in fact led astray by the direct provision that a chase may not be formed "within a distance of 7 ft. from any other chase on the same side of the wall," as if (by implication) the relative position of those on the other side of the wall were of no consequence; whereas in a party-wall of not more than 13 in. thick it would be of every consequence. Those who have had experience of the *un*-intelligence of many builders in the interpretation of building regulations will know that such an explanation would not be superfluous.

Clause 55, ("timber in external walls") shows the important modification that "loop-hole frames and frames of doors and windows" (the italics of course are ours) "may be fixed flush with the face of any external wall."\* This is a very important concession to the taste for flush window-frames which the Queen Anne revival has brought in. There is also a further paragraph for exempting from the provision of this clause, "by by-law or otherwise," oak, teak, or other wood, provided the work be constructed to the satisfaction of the District Surveyor.

Clause 56, as to bressummers, is in the main identical with the present provisions as to timber bressummers, with two additions: the District Surveyor may have power to require that a bressummer shall have such additional story-posts, iron columns, stanchions, or brick or stone piers or corbels, as he shall consider necessary to carry the superstructure; and that "the end of any timber not permitted to be placed in a party-wall" (i.e. where the party-wall is not thick enough according to the conditions of bearing on party-walls) "may be carried on a corbel or templet of stone or iron or vitrified stone-ware tailed into the wall a distance of at least 8½ in. or otherwise supported to the satisfaction of the district surveyor." Provision is also made that any metallic bressummer is to have a specified space for expansion (¼ in. to every 10 ft., or fractional part of 10 ft.). In our opinion, the bearing on the walls ought to have been increased in proportion to the length of the bressummer (wood or metal), instead of being placed at ¼ in. for any length—a very insufficient bearing for a long beam.

A new clause (58) provides that any portion of a wall which acts as a party wall, or any wall already built which becomes through alteration in the contiguous buildings, we presume) a party-wall in any portion of it, shall be deemed a party-wall "for such part of its length as is so used."

The provision as to carrying party-walls above the roof (Clause 59) is modified in detail so as to apply differently in the respective cases of a warehouse and "any other building." In a warehouse building the wall must be carried up above the roof the full thickness of the top-most story of such wall, and in any other building the thickness of 8½ in.; in a warehouse exceeding 30 ft. in height it is to be carried up at least 3 ft., and in any other building 15 in. in height measured at right angles to the slope of the roof, &c. (as at present). The regulation as to carrying up party-walls in proximity to turrets, domes, &c., remains as at present. This clause was strongly opposed by a committee of architects on purely architectural grounds, as spoiling the appearance of buildings; and we must say that in regard to semi-detached houses of a superior class and designed as one block we do think it an unnecessary demand, and at the same time calculated often to be a serious injury to a design. But in the case of ordinary street houses built in a continuous line we think the opposition to it was unwise, and that it is certainly an additional safeguard against the spread of fire, nor can we see its architectural injury in that case. It serves to break the long monotonous line of

roofs, and moreover it affords the chimney-stacks a visible structural basis, instead of making them appear to stand on the slates.

The rules as to the construction of roofs (Clause 61) stand as at present, except that among the surfaces that need not be covered with incombustible materials are included "wooden cornices and barge-boards to dormers, not exceeding 12 in. in depth" (another sign of the influence of changes in architectural taste). A sub-clause is added that every window above 30 ft. in height used wholly or in part as a dwelling-house or factory and having a parapet shall be provided with means of access to the roof by dormer window, door, trap-door, or otherwise. The inclination of the surface of the roof remains the same as now for warehouses, but a new clause is added for other buildings limiting the angle of the roof upwards to 75 deg. with the horizon (excepting, as before, towers and spires). This will not fall in well with architectural effect in some styles of design, and will hamper architects sometimes in rather a vexatious manner.

Clause 62 makes the important new provision that not more than two stories shall be constructed in the roof of any domestic building, and that any such story in the roof which is at a height above 60 ft. from the ground level shall be constructed of fire-resisting materials throughout; and Clause 63 requires that every new building shall be provided, on the stories exceeding 60 ft. in height from the street level, with such means of escape in case of fire "as can reasonably be required under the circumstances," and no such stories shall be occupied until the Council have certified that this provision has been complied with.

The main provisions as to the building of chimneys (Clause 64) remain, with the addition that they may be built on iron girders with direct bearings on party or cross-walls to the satisfaction of the District Surveyor. Flues not having proper soot doors may not be inclined "at a less angle than 45 deg. to the horizon, and every angle shall be properly rounded." This phrase appears to take the place of the present awkward one, "an obtuseness of not less than 130 deg." Another new provision is that soot-doors shall be "at least 15 in. from any wood-work."

The provision as to arching over chimney-openings stands as at present; there ought to have been an amendment by the introduction of the word "straight" in relation to the iron bar to be introduced as a tie; it is often made in the curve of the arch, which is no tie at all.

The clause under notice (64) is a very long one, including a great many sub-clauses as to flues. The first three we have already dealt with. No 4 is a new regulation, that a flue shall not be adapted to or used for any new oven, furnace, cockle, steam-boiler, or close fire used for any purpose of trade or business or for the range or cooking apparatus of a hotel or eating-house unless the flue is surrounded by brickwork at least 8½ in. thick from the floor on which the range, &c., stands to the ceiling of the room next above. The next paragraph (5) is also new and provides that a flue shall not be used for a steam-boiler or hot-air engine unless the flue is at least 20 ft. in height from the level of the floor on which such engine is placed.

The clause as to lining of flues is altered (6) to the effect that not only the inside of every flue but also "the outside where passing through any floor or roof or behind or against any woodwork" shall be "rendered pargetted or lined with fire-resisting piping of stone-ware" (in place of the present expression "fire-proof piping").

The next paragraph provides that the position and course of every flue shall be distinguished on the outside of the work as it is carried up "by outline marks in some durable manner," unless in the case of an external wall not likely to be built against

(There seems too much room for question as to what constitutes a "durable manner.")

The present clause as to the thickness of the back of a chimney-breast, which allows 4½ in. where it is not in a party-wall, is modified by the omission of this (which would be contradicted by Clause 54), the paragraph applying only to fireplaces in party-walls, with the same prescribed thickness as at present.

The highest six courses of every chimney-stack or shaft are now (13) to be built in cement.

The rule for the hearth-slab before fireplaces is now altered (15) from "at least 6 in. longer on each side than the width of the opening" to "at least 12 in. longer"—a very desirable modification. The rule as to the bedding of hearths adds to the present requirement, for upper floors, the words (16) "or other incombustible materials," and on the ground floor the direction, "on concrete covering the site or on solid materials placed on such concrete," is substituted for the present words "on the solid ground"; also an improvement. A further alteration is that the hearth or slab of every chimney, together with its bedding, "shall be solid for a thickness of 6 in. beneath the upper surface of the hearth" (17), in place of the existing 7 in. In regard to flues against party structures the present regulation is improved and made more decisive in wording, requiring that the flue shall be "surrounded with new brickwork at least 4 in. in thickness properly bonded" (18).

In the regulations as to timber or wood-work near flues the provision that no wood-work may go under a chimney-opening "within 18 in. of the upper surface of the hearth" is altered to "within 10 in." (21 b).

The "general rules" governing applications for the erection of chimney-shafts are now incorporated in the Act (Clause 65) in altered and more detailed form. The rules for width of base, extent of batter, thickness of brickwork at top, increase of thickness downwards, and use of fire-brick in the structure, are in effect as at present. The projection of the cornice of the chimney is not specially limited, but it is provided that "every cap, cornice, pedestal, plinth, string-course, or other variation from plain brickwork shall be provided as additional to the thickness of brickwork required under this Act, and every cap shall be constructed and secured to the satisfaction of the District Surveyor."

This is a very unsatisfactory sentence in wording, however good in intention, as it demands the impossible. How can a string-course or plinth be fixed as "additional to the thickness of brickwork required"? It must go sufficiently into the wall to be properly bedded: the clause is absurd. It is somewhat an anomaly, too, that the Act should have restricted (as we shall see) the projection of cornices in public buildings of an architectural character, but does not restrict the projection of chimney-shaft cornices, which are less important architecturally and the security of which is perhaps even more important constructionally. Altogether this is a very ill-considered paragraph. The provision (4) that the foundation of the shaft shall always be made "to the satisfaction of the District Surveyor on concrete or other sufficient foundation" is an addition, and a very wise and necessary one, and so is the following one (5) prescribing that "the footings shall spread all round the base by regular offsets to a projection equal to the thickness of the enclosing brickwork at the base of the shaft, and the space enclosed by the footings shall be filled in solid as the work progresses." These regulations are well calculated to diminish the risk of settling in tall chimneys. It may be presumed that the opening sentence of the first paragraph, that "every shaft shall be carried up throughout in brickwork and mortar of the best quality," is considered to render unnecessary the direct prohibition against the use of fire-brick in the constructional portion of a chimney-shaft.

Clause 66 embodies the "rules as to close

\* By an oversight in editing, some words of the existing clause are retained which have a contrary sense, though evidently not intended to be read so.



fires and pipes for conveying vapour," &c. The alterations from the existing rules are these: the rule as to the floor under any oven or stove contains the excepting sentence "which is not heated by gas," and the thickness of the incombustible material of the floor is now fixed at "not less than 6 in." The other provisions are the same as at present, only that instead of the defining words "under pressure" in regard to hot-water pipes, which are omitted, there is a separate clause exempting pipes conveying steam or hot water "at low pressure" from the restrictions as to position, and hot water or steam pipes are specially defined to be at low pressure "when provided with a free blow-off."

It is impossible to deal with the whole of the "construction" provisions in one article, and as the clause just mentioned concludes the provisions as to chimneys, fires, and heating apparatus we may break off here, and consider the rest of this important portion of the Act next week.

#### NOTES.

**T**HE preliminary report of the excavations undertaken during the present year at Hissarlik, the site of ancient Troy, under the direction of Professor Dörpfeld, is published in the *Reichsanzeiger*, the Berlin official gazette, and is the first intimation of the result of this year's work.\* Operations were directed almost entirely to the opening up of the sixth layer, according to the Dörpfeld classification, and the greater part of the fortified wall of the Acropolis has been laid bare. Two gateways have been discovered, on the east and south-west respectively, and the north-eastern gateway and tower, discovered last year, laid bare; the large dimensions of the latter are now explained by the fact that it contained the chief spring and cistern of the fortress. Within the walls a large number of buildings have been laid bare, as well as a quantity of store-rooms containing various ceramic objects bearing traces of "Mycenæan" culture. The investigation of the tumuli of the heroes, which, from pottery discovered, should be coeval with the city of the sixth layer, has unfortunately had to be abandoned owing to the non-arrival of the necessary "firman."

**A**N exceedingly interesting experiment in the revival of the Greek drama is promised for London next year. This is the performance, in English translation, of the trilogy of *Æschylus*, consisting of the *Agamemnon*, *Cophori*, and *Eumenides*. Incidental music for the two former plays is to be composed by Professor Villiers Stanford, who composed the music for the performance of the *Eumenides* at Cambridge, and who will conduct the whole. In order to carry out the work with archaeological accuracy, a guarantee fund of 2,000*l.* is desired, though it is not expected that the subscribers will be called upon, and a deposit of 500*l.* is required to provide against the preliminary working expenses, as it is proposed to carry out the undertaking "in a manner worthy of one of the greatest masterpieces of Greek genius." The net proceeds will be handed over to the British School of Archaeology at Athens, which is under the disadvantage of receiving no subsidy from Government, while the German, French, and American schools at Athens are all subsidised by their respective Governments. Although in one sense the effect of a translation will be inferior to that of a production in the original Greek, it is hoped that it will appeal to a much wider interest, this being the first attempt to bring the performance of Greek drama within reach of the general public in this country. It seems not improbable that such a scheme may prove a great success. The Honorary Secretary is the Vicountess Maidstone (Her-

monceux Place, Hailsham, Sussex) with whom all who are desirous to subscribe or assist are invited to communicate. In the allotment of tickets preference will be given to the guarantors. We are not yet told who will undertake the designing of the architectural accessories and costumes, which is even more important than the music; but considering that the scheme is in the hands of those who are seriously interested in Greek art, we may hope that these details also will receive competent attention.

**C**URIOSLY enough the *Times* on Tuesday last printed two communications on the subject of Roman remains in England. In the one case Mr. Kenward, F.S.A., urged the propriety of continuing the excavations at Uriconium—that is, Wroxeter—Salop. In 1859 some systematic attempts were begun to excavate on this important site, but they have been allowed to collapse, and this important work is now practically at a standstill. It is, in truth, a national disgrace that such remains as those at Uriconium are not investigated by means of public funds. They are ancient monuments of rarity and importance, and in almost any other country they would be carefully studied, and excavations made at the public expense. Thus in Germany the Roman Camps in the Taunus are being continually cleared of the soil of centuries and their form made plain, and they are adding to our knowledge of Roman methods of defence. In the other case, Dr. Thompson, vicar of Cardiff, tells of the discovery of a Roman villa near that town and asks for funds to continue the excavations. There are many well-to-do men in Cardiff, and there is plenty of public spirit in Wales, and we have little fear that this work will not be well supported. Probably the best chance for the permanent preservation of Uriconium and for the continuance of the explorations there would be for the work to be taken up by the Society of Antiquaries. They are in a position to carry on such work more effectually than any other body of men, and we hope they will see their way to take it in hand.

**A** CORRESPONDENT writes to us that as we have condemned the hideous advertisements by the side of railways in England he thinks we may like to know that in Belgium things are as bad, for advertisements are plastered on to works of architectural interest. He instances the *Porte de Gand* at Bruges, on viewing which the eye is struck by an advertisement of Singer's Sewing Machines. We entirely agree that to allow advertisements to be affixed to what are really ancient monuments is an act of vandalism; but both in Bruges and in other towns notices may be seen stuck all about the walls of churches and other buildings so as absolutely to disfigure them. But the citizens of Bruges are sinners in other respects: the town is full of disgusting stench; the sides of the streets contain domestic waste water, and the centre is filthy in the extreme—full of mud and refuse; to say nothing about the state of the pavement of the road, which is full of holes, and most uneven. In fact, we have no hesitation in saying that, to judge from outward appearances, the sanitary state of Bruges is very bad, and it is not a place to be visited by English in hot weather.

**T**HE *Times* of Saturday last contained the following significant letter in regard to London water supply, dated from Nash Mills, Hemel Hempstead, and signed "John Evans".—

"In September, 1893, appeared the report of the Royal Commission on the Water Supply of the Metropolis, in which, among other things, was recommended the abstraction of 2½ million gallons of water daily from the valley of the Lea, in addition to the 7½ million gallons daily at that time obtained from that source.

In September, 1894, circumstances remaining the same or nearly so, with the exception of the rainfall,

the directors of the East London Waterworks, in consequence of the diminution in the water of the Lea, and in order to economise to the extent of 10,000,000 gallons of water daily, are compelled to cut off the supply to their mains at night.

No more practical testimony to the real value of the report of the Commissioners can be imagined. Not a word of comment is necessary."

We are glad to give further circulation to Sir John Evans's letter, to which no attempt at a reply has appeared, and which goes to bear out the opinion which we have expressed all along as to the real value of the much-vaunted Royal Commission on London Water Supply, the whole tendency of which has been to bolster up the companies trading in water, and to persuade the London public to be content with a stop-gap policy, instead of demanding a scheme for really adequate supply. Further confirmation of this unpleasant truth will no doubt be forthcoming as time goes on.

**T**HE opening for traffic of the Muhlendamm locks on the 24th ult. marks the conclusion of the works on the canalization of the upper Spree, which have occupied the State and the City of Berlin for the last thirteen years. Communication for large vessels between the Elbe and the Oder is now established, and its importance will be realised yet more on the completion of the canalizing of the Oder through Breslau, thus connecting the Upper Silesian coalfields by direct waterway with Middle Germany. By the lowering of the level of the river, floods can now no longer occur at Berlin. The total cost of the works, excluding the regulation of the lower Spree, amounted to about 550,000*l.*, to which the city contributed about 390,000*l.*

**E**VEN though the long-looked-for general revival of trade be, as some suppose, near at hand, it will certainly be some time before the iron and coal trades of Scotland can reap any appreciable benefit therefrom. The resources both of masters and men cannot but be severely crippled by the prolonged strike of the miners of that country. With a great outside show of being "solid," the men are, apparently, very disunited in reality; and it is certain that, but for the "persuasions" of the pickets, male and female, a considerable proportion of those now idle would be in the pits. As it is, many are forced to leave the country in search of employment elsewhere, thus swelling the already overcrowded labour market at our northern ports. That this is a real evil may be inferred from the fact that the Mayor of Liverpool has considered it advisable to request the authorities in Glasgow and Edinburgh to use their influence to dissuade the men out of employ from seeking work in Liverpool. The Scotch miners are in a rather humiliating position. They receive subsidies, varying in amount, from the English Miners' Federation, who are thus in a position if not to dictate, to offer advice, the acceptance or rejection of which would materially affect the continuance of the said subsidies. They have had to throw over their own Secretary on account of his hostility towards their English allies, and although they are willing enough to meet the masters, it is only with proposals suggested by the English Miners' Federation some weeks ago, to which the coal-owners have already declined to accede. We still think that these proposals might at least have afforded a basis for settlement, and possibly more would have come of them had they been presented to the masters in a different guise. They were, however, naturally averse to swallowing English Federation terms, and it now seems not at all unlikely that they will be able to maintain their position without making any concession at all. Work is being resumed this week, under the old conditions, in several different districts.

**T**HE Institution of Civil Engineers has circulated a list of subjects on which it invites original communications, the invita-

\* The cost of the excavations up to 1,500*l.* was borne by the German Government at the instigation of the Emperor.



on, if we understand it rightly, not being limited to members of the Institution. For approved papers the Council has the power to award premiums out of the Telford Fund, the Manly Donation, the Miller Fund, the Howard Bequest, the Crampton Bequest, and the Trevelthick Fund. From the long list of suggested subjects we extract those which are likely to appeal most to our readers:—

"The arrangements of boilers and engines best adapted for electro-light stations under different conditions.

Steam locomotion for passenger traffic on common roads.

Mountain railways: their laying-out, construction, and working by cables, rack-engines, &c.

The laying-out and arrangement of railway stations.

The encroachments of and reclamation of land on the sea.

Investigations as to the quantity of water yielded by the chalk formation.

The purification of sewage by filtration, precipitation, electrolysis and otherwise.

The means and appliances, other than sewers, for dealing with the refuse of towns.

Plant for the treatment and disposal of waste products from manufactories.

The design and construction of modern gasholders of large size.

The methods of enriching gas for illuminating purposes and their relative advantages.

Alternate *versus* continuous electric currents for electric-lighting; and (b) transmission of power.

The utilisation of electric-lighting plant during hours of small demand.

The application of water-power, and its transmission to a distance by electricity.

The use of electrical motors for driving machines in engineering workshops.

Quarrying operations and the plant employed.

The manufacture and application of steel for structural purposes.

The molecular constitution of iron and steel.

The micro-structure of iron and steel.

The arrangement of engineering workshops, with descriptions of modern machine-tools and appliances.

The organisation and execution of any railway other work, with reference to the cost of materials, labour and plant."

Papers which have been read at the meetings of other societies, or have been published, will not be accepted. According to the by-laws every paper presented to the institution is deemed to be its property, and may not be published without the consent of the Council. The communications must be forwarded to the Secretary, from whom any further information may be obtained. There is no specified date for the delivery of MSS., when a paper is not in time for one session it may be dealt with in the succeeding one.

LAST week's fire at the Longton Theatre has rather rapidly followed the Reading one of only a month ago. Fortunately, neither commenced at an hour when the public was in the theatre, but in the early hours of the forenoon. Both fires resulted in the buildings being completely gutted, the losses in each case being nearly 15,000*l.* This is not surprising, as a theatre fire in a small provincial town, when once well alight, must naturally be beyond the powers of the local firemen. The only protective measure against complete destruction would here be good construction, and the division of the building into numerous risks. Both these necessities are, however, generally beyond the means of those who start the enterprise. Good exits for the public, and isolation, if possible, is all that can be asked for in such cases, and we hope that both these points will be observed when the re-erection of the Reading and Longton theatres is taken in hand.

THE concluding portion of Mr. P. Vedel's paper on "A Theory of the Actual Earth Pressure" appears in the *Journal of the Franklin Institute* for last month. The author has treated his subject from a mathematical standpoint, but most engineers are agreed that complex formulae relating to the pressure of earthwork are really of but little practical value. There are many engineering problems which do admit of mathematical treatment, but this is not one of them, as so many assumptions have necessarily to be

made, and it is but a waste of time to work out results to three places of decimals when it is quite possible that the whole numbers are not within 50 to 100 per cent. of the truth.

AN architect has forwarded to us the printed conditions issued for competitors for a proposed school in Brougham-terrace for the West Hartlepool School Board, which contains the following rather remarkable sentences:—

"The Board do not bind themselves to accept any plan as sent in, but reserve to themselves the right to require such modifications to be made without charge as they may think fit, and it is a distinct condition of this competition that they shall not be debarred from introducing any improvement merely by the fact that it appears as a feature in some plan which has not been accepted, or be required to make any compensation to the architect in whose plan the feature appears."

Most of us have heard of cases in which suggestions in non-premiated plans have been obviously adopted and incorporated in carrying out the premiated design, but this is the first instance within our knowledge in which a competition committee have published what amounts to an intimation that they intend to avail themselves of anything worth having in the non-accepted plans without recognition of or compensation to the author. It is no doubt perfectly possible that an improvement which is included in one of the plans submitted in a competition may have come within the knowledge of a competition committee or their surveyor from some other source, and in that case they would be exonerated both in law and commonsense from making any compensation to a competing architect for what they could show was an accidental coincidence. But where a suggestion has actually been taken from a non-accepted plan, any committee governed by a proper sense of honourable conduct would feel that they were bound to acknowledge their indebtedness to the architect openly and in a substantial manner. On the other hand, if an improvement included in one of the rejected plans had been honestly come by through another channel, it would be easy to prove this, and the architect in question would have no claim upon the Board. But by the sentence above quoted they have practically implied an intention of making use, without acknowledgment or compensation, of anything good which they may find in a rejected competitor's plans. Such tactics are not very wise, to say the least. The result will be to put architects who have any special knowledge on their guard against competing. In vain the net is spread in the sight of any bird.

EFFORTS are being made to revive the project of buying the freehold of the house at Chelsea which was for so many years the home of Carlyle, and, we may point out, of his wife, who surely should share in the remembrance. If the purchase can be effected we understand that it is proposed to convert the house into a "Carlyle Museum." Writing, in 1834, to a Mr. Bradfute, Carlyle says:—

If you remember Battersea Bridge, and Don Saltero's Coffee-house (celebrated in the *Taller*), with the ancient row of red-brick mansions clad with ivy and jasmine, shaded by high old lime-trees, along the bank of the river, you have Cheyne-walk, and are within a cat's-leap of Cheyne-row (at right-angles to the Walk, and a miniature copy of it) where in my new workshop, still and clear almost as the Craignutchie one, I now write to you. We like our old house extremely; have got it all set in order, out even to the little garden and the vine and walnut-tree. . . .

The house, which he tells his wife "is eminent, antique, wainscoted to the very ceiling," was then No. 5, Great Cheyne-row. It is not commonly known that in the agreement to take it, at 35*l.* per annum, Carlyle is described as of 47, Frederick-street, Gray's Inn-road. The house was afterwards re-numbered 24, Cheyne-row. The tablet set up eight years ago on the side wall of No. 49, Cheyne-walk by the Carlyle Society bears a portrait, in relief, executed by Mr. C. F. Annesley Voysey.

THE exhibition of "The Photographic Salon" at the Dudley Gallery, which is an attempt to show that photography can be used as a medium of the artistic expression of sentiment, is hardly more convincing to us than previous attempts of the same kind. What it does show in the way of satisfactory result in this direction is that much more of the sentiment of landscape may be conveyed than used to be supposed possible in photography; but this seems, as far as we can judge, to be achieved chiefly using the camera so as to leave out detail or render it obscure, and by choosing the point of view so as to produce the effect of what painters in former days used to call "composition." This has been very successfully done in some cases. Mr. Wellington's "Relics of the Past" (2) looks very like a brush sketch; Mr. Maskell, in one or two landscapes (45, 46, for example), has succeeded in producing an effect very like mezzotint; Mr. H. Hinton's "Twilight Grey" (57) impresses one as a charming bit of natural composition; Mr. Eickemeyer's snow scene (117) comes out very well, and gives charmingly the effect of the deep pure white snow with the delicate shadows where footsteps have trampled it. But one cannot feel feeling that all the producers of these photographs would have been better employed in endeavouring to draw and paint what they saw. As soon as stronger effects are attempted we become conscious of the stubbornness of the process, as in Mr. Craig Annan's "A Lombardy Landscape," where the pollarded trees are like black silhouettes. Under certain lights a painter might have shown them as such, but not in this hard and over-pronounced manner. Photography on rough drawing-paper has been tried, and even on rough canvas, but the result only looks like bad monochromes in water colour. It is when the figures come in that we realise fully the shortcomings of photography. How common and expressionless the faces look in "A Friendly Gossip" (136). Mr. Cameron shows some effectively-lighted portraits; but where landscape with figures is attempted the figures nearly always spoil the "sentiment" of the scene; so much do we owe in art to the painter's idealising influence. One of the most amusing attempts at the ideal is "A Naiad," a nude young girl standing ankle-deep in a pond among trees. As the subject is taken from life it would be uncourteous to criticise the figure, but it is very far from what we usually figure to ourselves as "a naiad!" In "The Penitent Magdalen," a foreshortened reclining nude figure, Mr. Berghem has contrived cleverly to avoid too hard a realism, though even here the success of the result as regards sentiment is very doubtful. Miss Reid's "Watching the Boats" (246) is a cleverly-arranged little scene where a young woman and a child are seated among sand-hills looking out to sea; the composition of the scene has been admirably got, but the woman has evidently overdone the attempt to put an expression of interest into her face, and the result again is half absurd, and entirely spoils the intended sentiment. One is reminded of Mr. Du Maurier's scene in the photographer's studio—"Try and look a little pleasant, Miss; I know it's hard, but it's only for a moment." We may point out that a view of Croner on the wall is erroneously described in the catalogue as "Tenby."

IT is announced that an exhibition of "Artistic Posters" is to take place at the Westminster Aquarium, opening on October 23. We fear the amount of artistic "postering" in this country is not very large, nor have we any great faith in the artistic element of anything started at the Westminster Aquarium, but there may be some interest in the exhibition. The names of some able and well-known artists are announced as among the contributors.



Carved Bosses at Intersection of Roof-grains, Cheltenham College Chapel.

#### BOSSSES, CHELTENHAM COLLEGE, NEW CHAPEL.

THE bosses illustrated are those to the main intersections of the groin ribs; the intersections of the *minor* ribs will be simply foliated. The ribs are here started in block only, as shown; they will be moulded when in place.

The bosses themselves are of considerable size, being 2 ft. 10 in. in diameter, and *in situ* they will be 55 ft. above the chapel floor. The block of each boss as illustrated is 3 ft. 6 in. diameter, and weighs over a ton. The subjects (taking them in the order illustrated) are:—

1. The Resurrection.
2. The Ascension.
3. The Last Supper.
4. The Descent of the Holy Ghost,
5. The Annunciation.
6. The Crucifixion.
7. The Glorification of the Blessed Virgin.

The first five were designed by Mr. H. A. Prothero, of the firm of Prothero & Philott, the architects of the new chapel, and the sixth and seventh were adapted by Mr. Prothero from ancient croziers now in the South Kensington Museum.

The carving has been executed by Mr. H. H. Martyn, of Cheltenham, architectural sculptor, under the direction of the architects.

PROTHERO & PHILLOTT.

**THEATRE, WAKEFIELD.**—The building of the Royal Opera House, Wakefield, is now completed, and will shortly be open to the public. Mr. Frank Matcham, of Warwick-court, Holborn, is the architect.

#### LETTER FROM PARIS.

It has already been mentioned that Alphand is to have a monument in Paris, erected by public subscription, and executed by M. Dalou. When mention was first made of this homage to the eminent engineer, to whom the population of Paris owes its fine promenades and the cleansing of its streets, it was expected that the site chosen would be either in the Bois de Boulogne, or in one of the principal avenues leading to it; instead of that, the subscription committee has fixed on the square of the Tour St. Jacques, near, it is true, to the Hôtel de Ville, but in no other respect a suitable position. The square is small, badly laid out, and not much frequented, probably on account of the proximity of the Halles. It will certainly afford little space for giving full effect to the *ensemble* of the projected monument, which, according to the model just finished, will be of large proportions, and of a fine decorative aspect. These considerations have apparently occurred also to some of the Parisian architectural authorities, for we hear that a proposal will be brought before the Municipal Council of Paris next session for erecting the Alphand monument at the entrance of the Ranelagh, behind the Gare de Passy, and opposite the house where the late Director of Public Works lived for forty years, and where he died. It is to be hoped this last position will be preferred.

Five hundred and thirty-seven architects, engineers, or artists have already demanded permission to compete for the Exhibition of 1900. As the list will not be closed till the month of December, one can easily

foresee that the jury of examination will have a heavy task, even to eliminate in the first instance the numerous fantastic, impracticable, or simply absurd projects which always appear in such competitions; and after completing that portion of the task, the jury will still have great difficulty in making a selection from among the designs which may be in conformity with the regulations laid down by M. Picard, who has reserved to the Administration the absolute right to accept anything which appears good in any design, without the obligation to adopt it in its entirety. This will certainly be a very difficult business, demanding not only the examination of the plans, but also the careful study of the reports and estimates which will accompany them, without which, however, it will be impossible to arrive at any practical conclusion.

The proposed reconstruction of the Gare de Lyons, which we have already referred to, is to be taken in hand in the spring, according to the scheme approved by the Department of Public Works, which has been drawn up by M. Jonnart. The site at present occupied by the Paris, Lyons, and Mediterranean Terminus will be considerably enlarged by the acquisition of some ground and building yards adjoining. This will allow space for fourteen lines of rails in place of six, the departure and arrival platforms being opposite to each other, on the same system as that adopted by M. Lisch in the reconstruction of the Gare St. Lazare. Externally the new façade will have a monumental aspect, which will rival that of the Gare du Nord. The works are to



be completed in time for the exhibition of 1900.

It appears that, as the result of the study of the subject in England, the municipal administration has at last decided to construct in Paris, in the quartier de Javel, a refuse destructor of the same type as that at Leeds. If the result is satisfactory other destructors will be erected in Paris, especially in the neighbourhood of Père la Chaise, where several such furnaces will be kept burning continually, to dispose of the refuse from the quarters on the right bank, as well as that from the cemetery.

At the Church of Sacré Cœur a number of workmen are employed in the construction of the great dome, which is now completed up to the first cornice. The interior and exterior cupolas will be built next year. The first will be at the height of 60 metres, and the second at 85 metres above the floor of the church. The completion of the campanile will be a longer business, and it is not expected to be finished before 1896; its height will be 125 metres, which, joined to that of the Montmartre hill, which is 127 metres, will raise the edifice to a height of 252 metres above the plain. The cost of this portion of the work will be very considerable; up to this date the subscriptions amount to a total of 27,594,000 francs.

At the Jardin des Plantes the new buildings for the Museum are advancing rapidly, being all completed except the roof. The exhibition rooms are arranged in a large rectangular building; the adjoining amphitheatre will be surmounted by a monumental dome.

A few days since there was opened on the Boulevard Poissonnière, just at the corner of Rue Montmartre, a large public establishment which has been called the "Parisiana Concert." This music-hall, prettily and coquettishly decorated, is the work of M. Jandelle *filz*, architect, with the collaboration of M. Emile Derré, as sculptor, and M.M. Beisson and Cron, decorators. At the Champs Elysées a new Salle de Spectacles is being constructed, on the site of the old Panorama, which itself succeeded to the Théâtre des Folies Marigny. Not far from there, at the entrance to the Rue de l'Orfèvre, there is also a palatial building in progress, intended for meetings, fêtes, and bazaars. Lastly there is talk in the War Department of transferring to the suburbs all the regiments at present in barracks in Paris, as well as all the magazines belonging to the military service. This scheme would lead naturally to the demolition of the different barracks, the value of which is estimated at about 70,000,000 francs, and the building of new barracks in the outer circle of the suburbs, the construction of which would give employment to a number of workmen for some years.

At the Hôtel de Ville the decorations still go on. Since we last referred to the subject, the restaurant of the Municipal Council has been fitted with the stained-glass window executed by M. Carot, after the cartoons of M. Besnard, which figured in the Champ de Mars Salon this year. One of these windows represents the old apple-market called "Le Mail," which was held on the bank of the small arm of the Seine between the Pont Louis Philippe and the Pont de l'Hôtel de Ville. The other represents children sending up luminous balloons on a public fête day. It may be mentioned at the same time that M. Forain is to decorate the walls of this same restaurant. Other windows, of which M. Lerolle has given the designs, will be placed a few months hence in the cloak-room of the Municipal Council.

We may notice here some new acquisitions for our national museums. At the Louvre (where the gallery of bronze antiques has been completely re-arranged) there has been deposited a portrait of the Countess of Anjou, by John Hoppner, as well as the portrait of a man by Lucas Cranach, a Virgin of the Flemish school of the sixteenth century, and various drawings by the painter Bouvion. At the Versailles Museum there has been acquired a fine portrait of the Empress Josephine, and the study of the head of Marat, by the celebrated Louis David, as well as some watercolours by the same painter, dating from the revolutionary period; also a portrait of Marie Antoinette in prison, by Kocharsky, and lastly, an immense picture by M. Roll, exhibited last year at the Champ de Mars, which represents "La fête du centenaire des États Généraux au bassin de Neptune à Versailles, le 7 Mai, 1789."

On the 14th will take place, in the vestibule of the Hemicycle of the Ecole des Beaux-Arts, the inauguration of the monument to the eminent architect, Duban. The monument, designed by M. Bernier, and of a specially architectural

character, consists of a pedestal of white marble supporting a bronze bust of Duban.

An artist of great merit, M. Gustave Lévy, who obtained the medal of honour in engraving at the Salon of this year, died a few days since at the age of seventy-five. In 1846, M. Lévy had obtained a medal of the third class; in 1890 he obtained a medal of the first class, and in 1892 the Cross of the Legion of Honour. His engravings are very numerous. Among the best known may be mentioned that of the portrait of Crémieux, exhibited at the 1880 Salon, and that of the portrait of the Chief Rabbi Isidor, which was in the Salon of 1883. Age had not impaired the firmness of his hand or the delicacy of his touch, as was proved by the engravings which he exhibited this year of the portrait of Renan, and that of Madame Mire, after two paintings by M. Bonnat.

#### ARCHITECTURAL ASSOCIATION:

##### SUMMER VISIT TO NORTH MIMMS.

A LARGE party of members of the Architectural Association went on Saturday last to visit the old house at North Mimms, and to see the new additions now being made to it by Messrs. Ernest George & Peto. The old house, built by Ralph Coningsby at a date unknown, but probably about 1600 A.D., has no great family history or tradition—and, indeed, may be said to have been rather unfortunate. Itself the successor of an older house, it has repeatedly changed its owners, and has by them suffered many alterations until of Ralph Coningsby's building there remains little more than the external walls. The additions which are being made for the present owner, Mr. Walter Burns, are vastly larger than the original house, which now becomes part of a country mansion.

The most important alterations to the original house, prior to those now in progress, were probably made at the beginning of this century, for the house changed hands in 1799. At that time the main entrance to the house seems to have been transferred from north to south, and corridors added, diminishing the size of the southern court. The original entrance is now to be re-used, opening into an outer hall, from which is entered the inner or principal hall, which in the hands of Messrs. Ernest George & Peto is becoming a charming feature, its height being that of the full two stories, with an oak roof over, whilst a new canopied fireplace in Ham Hill stone with carved frieze, and an oak staircase and gallery at one end, complete the main points of the interior of this apartment.

The reception-rooms in the old building will now be—the dining-room and breakfast-room on the west side, the two halls already mentioned in the centre, drawing-room on the east side, with library and saloon on the first floor. The new work consists of a long wing projecting on the west from the south side of the old house, and containing a morning-room, open loggia, billiard-room, and gun-room. At the rear of this wing, and on the west side of it, is a second wing, containing kitchen, scullery, laundry, offices, and servants' quarters. The external treatment of the new work follows in material that of the old house—red brick, with diaper patterns of greyish-black brick, and dressings of Bath stone. The detail, of course, follows the method of the English Renaissance, of which the old house is recognised as one of the examples worthy of notice, but Messrs. Ernest George & Peto's work is not bounded in conception or execution by the quality or the finish of the old work. As part of the changes in the *exterior* of the house may be noted the removal of the stables, which, more modern than the house, were built on the south side, and the substitution of a formal garden, with fence walls and iron railings.

The removal of the old stabling has been compensated for by the erection of a fine range of new stables some distance to the west of the domestic buildings. The stable buildings enclose three sides of a quadrangle. Stalls and loose boxes are placed on one side, coach-houses on the other, with at one end a group of four separated loose boxes to serve as an infirmary, and at the other end stalls for visitors' horses. The front side of the quadrangle contains coachman's house, mess-room for grooms, and harness-room. A certain flavour of antique rusticity is given by the use of oak posts and oak window-frames flush with the brickwork; but simple materials, red and black brick and tiles, are sufficient in the hands of Ernest George & Peto to bring about good results. The stalls and loose boxes are lined with green and white glazed bricks with wood dado, and to keep out the extremes of temperature, the

roofs have a thatch of Norfolk reeds under the boarding and tiles.

After spending a very enjoyable two hours at the house, the party went to look at the church, which possesses considerable interest from its brasses and memorials, chiefly to the Coningsbys, whose coat-of-mail, with its three conies, is much in evidence. The church consists of a nave of three bays, with aisles north and south, chancel and north chancel aisle, which latter is variously described as the Lady Chapel, the chantry chapel of St. Catherine, and the Coningsby Chapel. There is a south porch and western tower, which, with its lofty spire, is charming in colour. The church dates principally from the first quarter of the fourteenth century; possibly the date of the chantry chapel of St. Catherine, founded in 1323 by Simon de Swonlond, is approximately that of the greater portion of the edifice.

#### THE SANITARY CONGRESS AT LIVERPOOL.

##### (SECOND NOTICE.)

##### THE REFUSE DESTRUCTORS.

THE President said Mr. Brodie, Mr. Deas, and Mr. Royle would be called upon to read in succession the papers they had prepared, and to explain the designs and drawings arranged on the walls, and the discussion would commence after all the papers had been heard. An animated discussion might be expected in an audience which contained so large a number of gentlemen interested in discovering the best forms of destructor. The occasion might, in fact, be fairly termed the "Battle of the Destructors." Mr. Brodie (late Deputy Borough Engineer of Liverpool) dealt in his paper firstly with the method of disposal of town refuse adopted in Liverpool, and secondly with the treatment of other refuse in a destructor, the design of which had been patented by the City Engineers (Messrs. Boulton & Brodie). The Corporation of Liverpool had started an exhaustive investigation for the purpose many years ago, under Mr. G. F. Deacon, the City Engineer of that period, and it was finally resolved to try sending the refuse out to sea by a specially-constructed steamer. The first trial which had been made in 1879 had proved very satisfactory, and in 1884 a second steamer was added to the service. Certain matters such as tins, baskets, light materials, vegetable débris, &c., being first removed, the remainder, amounting to 150,000 tons annually on the average, was loaded up into steamers respectively of 300 and 400 tons capacity. Each steamer, which had a speed of about ten knots per hour, contained a large open hold at the bottom of which were twenty hinged doors each 10 ft. by 4 ft. controlled by chains worked by a winding engine. The discharge occupied but a few minutes when the steamer had reached its allotted position (now never less than 25 miles from the town) and within twelve hours it had returned to the dock. The refuse was collected in carts and brought in barges to a convenient position for being delivered into the hold of the steamer, the loading of which was formerly effected by the costly process of hand labour with the shovel. The system of steel boxes, of which there were twenty-four, each having a capacity of about 2½ tons, had effected a very great economy both of time and money. The town refuse carts are driven up to a platform, turning by means of a cantilever arrangement, so that the contents of a number of carts are tipped simultaneously into the boxes in the barge, which then takes them to the special steamer in the dock. By means of this ingenious turning arrangement five men suffice for the rapid loading of a barge, a load of 55 tons being commonly taken on board in 17 min. This had reduced the cost of loading, which previously to 1891 had been 6½d. per ton, to 1½d. per ton, effecting a saving of 2,180l. a year. In 1890 the quantity of town refuse had so greatly increased that the two steamers no longer sufficed, and the new Borough Engineer, Mr. H. P. Boulton, suggested that the lighter stuff should be got rid of by the Destructor method. A 12-cell Fryer Destructor was completed in July, 1891, but certain improvements had been since introduced, the principal object of which was to get rid of the hand-shovelling which had hitherto been necessary in charging the Destructor at the opening, and which was the most objectionable, uncleanly, and insanitary kind of work. Through these improvements a greater amount of work was got through per cell, and there were no longer any of those repulsive heaps of refuse which were 50



often left over formerly, to poison the surrounding air with their noxious fumes. The men were no longer covered with insect vermin, as they had formerly been, and were no longer compelled occasionally to go down among the stuff to facilitate its passage down to the hoppers. The various modes of feeding the stuff in by mechanically-travelling bands and hoppers, all had their difficulties, and therefore they had fallen back on a modified form of the box and truck system, which had been applied in the last twelve cells constructed.

By a back-to-back arrangement of the trucks, each commanded two cells. The charging-openings were closed by a sliding door travelling on rollers and operated by a winch, the doors being made smoke-tight. The principal advantages of these modifications of the Fryer system as claimed are (1) quick discharging of loads by the carters, (2) direct delivery to the cells without hand-labour, (3) the men never need go down among the material, (4) the rapid opening and closing of the doors, which minimises the admission of cold air, (5) the reduction of labour by which 325*l.* a year, or 4*d.* per ton destroyed, is saved, (6) cleaner and more sanitary arrangements, and (7) the reduction in the cost of maintenance. The few months' working had proved so well the merits of the arrangement that the authorities of Toxteth, Wallasey, Brighton, and Cambridge were putting up cells constructed on the same principles, and in the latter steam was being produced by the destructor to supply the pumping-station from which the sewage of Cambridge and two neighbouring districts is lifted and delivered to the precipitation works and farm.

In this installation there are six destructor cells and three water tube boilers so arranged as to have the boilers sandwiched in between the pairs of cells. A powerful air blast had been added in order to maintain a high temperature.

Mr. James Deas (Warrington Destructor Works) read the second paper, and explained the method in use at Warrington under the patent of Beaman & Deas. It seemed to be now generally agreed, he said, that the most economical, as well as the safest, method, from the point of view of the public health, was to destroy all refuse by fire. The great objection to the forms of destructor at present in use was the possibility of offensive vapours and charred particles escaping by the chimney-shaft into the surrounding air and causing a nuisance to the neighbourhood, the charging arrangements being so constructed that offensive vapours were given off without being exposed to a sufficient heat to render them inoffensive. The necessary conditions for a perfect destructor were:—1, To destroy rapidly unscreened refuse of every kind, without committing any nuisance; 2, to reduce the refuse dealt with to the least possible amount of clinker; 3, to deal with the refuse and bye-products with the greatest economy.

In the new destructor at Warrington, where his system had been worked continuously night and day for the last thirteen months, these conditions were successfully carried out. All the gases were absolutely destroyed by the radiation of the intense heat of the furnace by being drawn through and over the hottest part of the fire, entering into ignition and complete combustion in the chamber (where a temperature of over 2,000 F. was maintained) before finally passing away through the boiler. This intense heat and form of furnace did away with the necessity of a secondary fire or fume-cremator. The results obtained had been certified by the County Analyst, Mr. J. Carter Bell, whose report stated that no trace of mephitic vapours was found in the samples of gases taken. The Corporation of Leeds made an independent test, of which an official report was made by the officers deputed for the purpose, Messrs. Geo. Daley and C. T. Carter. The report stated the following, with other particulars:—Duration of trial, 24 hours; nature of fuel, unscreened refuse; total quantity of fuel burnt, 23 tons 18 cwt. 1 quantity of fuel per hour, 2,31 lbs. = 19 cwt. 3 qrs. Quantity of water per hour, 255 gals. (12·71 horse-power). Weight of clinker produced, 6 tons 13 cwt. Quantity of water evaporated per lb. of house refuse, 1·14. Average temperature per copper-wire test, 2,000 F. This furnace had been at work since August, 1893, and was now as good as when erected. The author in conclusion said: "From daily experience I find that I can evaporate 1 lb. of water from 1 lb. of unscreened town refuse, and the value of steam, in my opinion, from burning town refuse, will form a very important factor for corporations in the near future."

The third paper, which attracted but little attention among the very practical administrators

who formed the bulk of the large audience, because the scheme indicated in it had so far found no visible embodiment, referred to the nauseous smell and fumes given out by destructors; to obviate which a fume cremator was sometimes employed, but this was a sign of a destructor that had been constructed on a wrong principle. The inventors of the Acme Destructor, as they had called it, had kept in view the necessity of complete combustion of all the organic matter, and not the merely putting it out of sight and smell. The drawings showed the method of effecting this. The refuse was tipped into the large receptacle or hopper, from whence it fell through the opening on to the sloping bars, which were set at about an angle of 45 deg.; and as the organic or combustible portion were burned out, the residual material gradually fell to the lowest position, whence it was removed by the attendant at the front and side (using a long-shanked shovel). As quickly as it was removed a further quantity fell down the inclined plane formed by the bars, which, in its turn, was followed by a fresh portion from the hopper. Thus the feeding-in of the material was almost as gradual as though rocking bars were employed. The action of the hanging bridge was important; any vapour evolved from the raw material was deflected partly over the surface of and partly actually through the already incandescent portion lying below, and there it also met the red hot gases arising from the combustion of the lower portion, and becoming ignited, finally passed through the combustion chambers, heating these to such a high temperature that no combustible vapour could escape. As each spadeful was withdrawn, it was followed through the whole system by an equal volume of the raw material, the volatile matter from which being thus slowly evolved had ample time for complete combustion, which could not be the case where large charges were thrown on at one time. Although designed as a destructor only, it was as capable as any other of being adapted to the generating of steam when the material to be burned contained enough heat-producing material; it equally permitted the use of rocking-bars, as also the use of a steam or other blower being applied.

#### Discussion.

The President having invited discussion to continue till the time fixed for the adjournment for lunch and a visit to the Destructor Works at Chisenhale-street, Liverpool, those at Toxteth, and to the Electric Supply Company's station, a rapid fire of questions followed from many members, and it was decided that all the questions should be answered together on Wednesday, when the discussion would be resumed.

#### CONFERENCE OF SANITARY INSPECTORS.

This conference, which was also well attended, was presided over by Dr. Francis Vacher (Birkenhead), who, in his opening address, after suggesting that the subjects to be debated should be opened concisely, and be discussed with moderation, offered some sound advice to young sanitary inspectors as to how they might make themselves thorough and efficient officers; especially dwelling on the importance of precision and exactness in observation and in reports. However clever or brilliant or fertile in expedients a man might be, if he worked without system, men having half his abilities would be advanced before him. Method and order were not necessarily inborn characteristics, but they might be acquired, and they were certainly worth acquiring.

Mr. Davenport, C.E. (Nantwich), next read a paper on the effects of the Parish Councils Act upon the future of rural sanitary inspectors. The sanitary inspector of to-day, he observed, was very unlike his colleague of thirty years ago. At one time anyone was thought good enough to be an "inspector of nuisances" as he was then called, but now he must have certificates showing that he possesses a fair knowledge of all those sciences which must be studied by the doctor, chemist, engineer, and a host of other professions or trades. The Act of 1894 would doubtless in some cases be of benefit to the rural inspector and to the district of which he had charge, but its force was greatly weakened by the fact that nearly all the rural officers were appointed for only limited periods of one, two, or it might be three years. The reappointment rested entirely with the district council, and the period of transition was naturally one of great anxiety to the inspector. It often happened that a sanitary inspector in the conscientious discharge of his duties fell under the displeasure of some member of the council or their friends, and his position required strengthening. Cases of hardship had arisen in the past,

and possibly some of the sanitary officers would suffer in the transfer of the powers of local self-government, but the author expressed his opinion that in the main they would be justly dealt with. In the meantime, they should continue to agitate for permanent instead of periodical appointments.

Mr. Cooper (Liverpool) gave an account of the progress of the local branch of the Sanitary Inspectors' Association (the North-Western District), and then Mr. Scott Elder (Durham) was called upon to read a paper on the Difficulties and Drawbacks of the "Sale of Food and Drug Act."

After the luncheon interval Mr. Bland (Barton-on-Irwell) was called on to read his paper entitled "Our Programme." He concluded by giving notice that at the resumption of the Conference on the following day he would move a resolution in favour of assimilating the position of the sanitary inspector with that of the M.O.H. with regard to the period of his appointment, the control of the Local Government Board and of the County Council.

The Congress adjourned for the purpose of proceeding to the Cheshire side of the Mersey to visit the Hospital for Infectious Diseases at Birkenhead, the abattoirs and cattle lairage, and the Wallasey Waterworks.

*Overcrowding houses on land.*—The last business of the day was a remarkable lecture given by Dr. G. B. Longstaff, dealing with the question of crowding dwellings together on inadequate sites. In the lecturer's opinion, medical officers of health often attached disproportionate importance to zymotic diseases, while amongst laymen the word sanitation had come to mean drainage. Undoubtedly zymotic diseases were deadly, but he would remind his hearers that while the connexion of diphtheria and scarlet fever with drains was quite open to question, there was no reason to suppose that whooping-cough and measles had any connexion whatever with sewerage arrangements. In England and Wales on the average zymotic diseases caused but one-sixth of all the deaths, whereas to diseases of the lungs, including phthisis, must be ascribed one-fourth of the total. On taking the Liverpool figures for last year, while zymotic diseases caused but one-sixth of the total deaths, diseases of the lungs and phthisis caused nearly one-third. The inference that he drew from these figures was that hygiene a constant supply of fresh air was of paramount importance. He set ventilation before drainage in its effect upon health. Liverpool played a very special part in sanitary statistics. It had for many years been an awful example as the nadir of sanitation, appearing over and over again at the bottom of long tables of death-rates, but still more it was an example of what honest persevering work could do. An immense development of manufacture led to the rapid gathering of masses of men, women, and children. The port grew with the manufacturing towns, and the Liverpool of to-day still suffered from the ignorance and neglect of the not very distant past. The fearful year of the Irish famine, followed but two years later by the cholera epidemic, set men a-thinking, and action soon followed thoughts. In half a century the death rate of the borough had fallen from thirty-six to twenty-six per thousand—an improvement which might be better appreciated when put in the form of an annual saving of 5,350 lives. It was one most important matter of hygiene Liverpool was the leading city of the empire, for it had altered the geography of Wales by the formation of a new lake for the purpose of supplying pure water.

In the slums of Liverpool, as of Whitechapel, were to be found over-crowding, filth, pauperism, and ignorance; but yet the Whitechapel slum did not exhibit a death-rate at all comparable with those of Exchange Ward, Liverpool, which reached 99 per 1,000, or of Vauxhall Ward, which reached 43.

A special form of over-crowding of buildings from which Liverpool and other northern towns suffered greatly was that known as "back-to-back" construction. Blocks of cottages built on this plan faced upon two streets without any intervening space, so that except at the ends, each tenement had but one external wall. In addition to other grave disadvantages of the kind commonly called "sanitary," it was impossible properly ventilate such houses, as a through current of air was out of the question, and it was difficult to light them adequately. To the Surveyor of Manchester, Mr. Allison, were admirable plans for the partial reconstruction of such blocks, designed to diminish as far as possible and at the lowest cost, their inherent qualities. He had long ago come to the conclusion



sion that the carrying out of reconstruction schemes would be greatly facilitated if the municipality were made the authority for closing and diverting highways. The municipality was now the controlling authority as regarded new streets, and it should have the correlative powers.

The lecture was attended by a very large audience, and its interest was enhanced by some limelight views.

The Ladies' Section, one of the most numerously-attended and best-conducted of the sections, discussed subjects connected with "Domestic Hygiene," commencing with an address by the Lady Mayoresse, and included papers on "The Ethics of Sanitation" (by Mrs. Percy Boulnois), "Health at Home," "Hygiene in Schools," &c. The ladies alone succeeded in getting through the whole list of papers on the day appointed for their conference.

#### THE THIRD DAY.

The discussion upon the three schemes of refuse destructors was opened in the Engineering section by Mr. Jones (Ealing), who spoke strongly in favour of the system expounded by Mr. Brodie. It was the best thing of its kind that he had seen. With regard to the system of Mr. Royle, he could only judge of it from the paper; he was not aware whether it had been anywhere erected. He (Mr. Jones) ought to feel gratified at the involuntary testimony borne by Mr. Royle to the value of the cremator he professed to criticise. It was curious to find charged as a fault against it, that it did precisely the work that it was designed to do, viz., that it burnt the fumes. Mr. Deas had given them no idea as to the cost of his apparatus. It looked to him an expensive one. He thought he could erect a three-cell destructor to do all that this one would do at two-thirds of its cost. Mr. Deas had not said much about the nature of his materials. In twenty-four towns you would get twenty-four sorts of refuse. He might from certain materials get a great deal more solid matter in twenty-four hours than from others, but a destructor must be prepared to deal with any refuse in any town. Things could not go on for ever with 2,000 degrees of heat continually indicated on the pyrometer. What would be the condition of this destructor with one cell, say a year or eighteen months hence? What they really required was a destructor simple in construction, ordinary in its working, and effectual in its results. Their object as municipal engineers was to deal with a nuisance, and get rid of it in the simplest, most inexpensive, and yet most efficient manner. He informed the Conference that they were endeavouring at Ealing to utilise the destructor for electric work, and the installation of the electric light would take place in a few days.

Mr. J. T. Wood (Liverpool) said that he had had the management of destructor works on the Brodie and Boulnois principle, and had found them very excellent and very economical in working. He criticised the two other projects from several practical points of view.

Mr. Crowther (Booth) advocated the principle of cremation for all town refuse. It ought never to be sent to sea. He had had some opportunity of seeing the result of this in the matters thrown up on the shores in the estuary of the Mersey, and what he had seen was anything but pleasant. Questions had been asked as to the cost of destructors, but he could understand that it was not easy to give any hard-and-fast rule as to cost.

Mr. Beaman (Warrington) wished Mr. Jones had not introduced so much feeling into the discussion. (Hear, hear.) Mr. Jones said the intense heat must be destructive of their furnace, in disproof of which he produced four specimen bricks to show the effects of fire in a heat of over 3,000 deg. Fahrenheit. A stalaclite of incandescent dust was formed upon bricks exposed to an intense temperature. He criticised the method adopted in Liverpool of disposing of refuse by emptying it into the sea. This could not be done in inland towns, and a great deal could be laid at the doors of the Corporations situated on the sea-coast or upon the tidal waters of the rivers of England for allowing their town refuse, either in a liquid or more substantial form, to go into the sea and rivers.

Mr. G. F. Deacon, C.E., said that as the Engineer of Liverpool at the time when the system of taking the refuse out to sea had been decided upon, he had before that was done been directed to carry out a long series of investigations to ascertain the probable result of that method of disposal. In the first trials a certain proportion of the lighter refuse was found on the surface of the water, but in an estuary like that of the Mersey at Liverpool the heavier matters did

not come back. Corks, cinders, &c., had always been found in the outer estuary, and he did not think any more were found now than before the adoption of this plan of disposal. Where they had such a current as in the Mersey, there was no reason why any refuse should come back.

Mr. Monks (Chairman of the Warrington Local Board) invited the members of the Conference to go over to Warrington to see the destructor at work. If Mr. Jones had done so he would not have said what he did. Some municipal engineers evidently did not know what high temperatures meant. He was of opinion that the invention of Mr. Deas would revolutionise the construction of destructors, though he was not surprised at the scepticism that had been displayed.

The President said it was very well to give credit to modern destructors, but credit was also due to the pioneer destructors erected twenty-two years ago to destroy the refuse of tanneries. He would have liked to hear given some estimate of the cost of destructors per cell, and he should have liked to see drawings produced by Mr. Jones. The readers of the papers were then called upon to reply.

Mr. Brodie, in answer to Mr. Ebbits, said the amount of refuse burnt per cell per day would vary from 6 to 10 tons, according to the nature of the material and the amount of labour employed. With a rate of 10 tons per cell the labour required would be more than in proportion to the increase. Mr. Deas had claimed to evaporate 1 lb. of water for every pound of refuse, but that was more than could be obtained regularly. Ten tons would develop 37 or 38 h.p., but a proportion would be lost in providing the forced draught. He pointed out that as the bricks produced by Mr. Beaman were broken, nothing conclusive could be drawn from them.

Mr. Deas, in reply to criticisms, said the greater the heat maintained in the furnace the smaller the residuum; that was why at Warrington they had only 27.9 per cent. of clinker, while at Rochdale, according to one speaker, they had 57 per cent. They found the cost of burning was 53d. per ton, but they hoped to reduce that to 5d., or, if twenty tons per day were burnt, to 44d. A proper datum for comparison would be to state in each case how much refuse was burnt per square foot of fire-grate. Extreme heat made perfect combustion and a small amount of residuum. It had been repeatedly stated that the extreme heat employed at Warrington must be destructive of the furnace. He could only repeat that they were regularly disposing of 20 tons every twenty-four hours, at over 2,000 deg. F. temperature, and that the furnace in fourteen months' working had not cost a penny. During the process of burning, fine particles of dust fixed themselves on the crown of the arch, and exposed portions of the furnace, in a stalaclitic form, thus protecting the brickwork from the intense heat. The stalaclite had been analysed by Mr. Carter Bell, and had been found to contain 55.364 of silica, 15.711 oxides of iron, and 17.362 alumina, the rest being lime, magnesia, potash, soda, and sulphuric acid. In answer to further questions as to the cost of the Warrington installation, Mr. Deas said it was impossible to give an estimate because the plans had been frequently altered during the construction of the destructor, which was an experimental one.

Professor Hele-Shaw said he did not profess to know much about Destructors, but it struck him very forcibly as desirable that they should appoint a committee of persons not interested in any particular form of destructor to prepare a report. Such a committee could collect the necessary data to decide the important question of comparative cost, which could only be properly debated by some such committee.

A resolution was carried to refer this proposal to the Council of the Sanitary Institute.

#### CONFERENCE OF SANITARY INSPECTORS.

Two papers were left over for discussion on Wednesday—one by Mr. W. W. West (Walthamstow), on the "Powers of Inspectors in the Abatement of Nuisances," and the other by Mr. Wells (Newcastle-on-Tyne), on the "Revision and Consolidation of the Public Health Acts"—but the most important business left over was the discussion on the paper of Mr. Bland (Burton-on-Irwell), on "Our Programme," read on Tuesday. Mr. Bland claimed that in future examinations for Sanitary Inspectors' certificates, practising Inspectors, who had a practical knowledge of the carrying out of the Sanitary Acts, should be on the Examining Board. The proposals of Mr. Bland were adopted against the appointment of

Medical Officers of Health, Sanitary Inspectors, or Inspectors of Nuisances being made for only definite periods of time, and in favour of extending the powers of the Local Government Board with regard to tenure of office, so as to apply equally to all Sanitary Officers, Sanitary Inspectors, and Inspectors of Nuisances, as well as Medical Officers of Health, and in favour of empowering County Councils to make representations to the Local Government Board either for or against the dismissal of all such sanitary officers. Mr. Poulson (Staffordshire County Council) submitted a requisition which was generally approved and numerously signed, asking the Council of the Sanitary Inspectors' Association to earnestly consider and proceed forthwith to arrange for the solidarity of all bodies of Sanitary Inspectors, for the prosecution of the question of the security of tenure of office, and all cognate questions affecting the welfare of Sanitary Inspectors.

#### FOURTH DAY.—ENGINEERING AND ARCHITECTURAL SECTION.

On Thursday Mr. G. F. Deacon, the President of this section, delivered his opening address to a very large audience. He thought it natural that he should begin his address by devoting his first remarks to the city to which he had devoted the first twenty-five years of his professional career—Liverpool—and that he should conclude with a glance at the engineering problems of the great metropolis (London) to which he had gravitated in 1890. Many years ago the late Mr. Thomas Hawksley had shown that the notion prevalent that the health of Liverpool was exceptionally and pre-eminently bad was even then not justified, but it was after 1875 that a change for the better took place in Liverpool beyond that observed in any other of the seventeen great towns with which it could be compared. In the critical year, 1876, Liverpool for the first time obtained a constant water supply, with a good internal pressure of water always in the mains throughout the district. The chief advantage sought in making a supply of water intermittent was to limit the amount wasted through leakage by cutting off the supply from the reservoir to the mains for a portion of the twenty-four hours, but the same thing might be effected by preventing all leakage, and where that was done a constant supply was as economical, and, as they had found at Liverpool, more economical in water than an intermittent supply. "This," said the President, "is precisely what was done in Liverpool in 1874 and 1875. The water which had been formerly saved by curtailing the period of leakage, and of supply for consumption alike, was now saved by reducing the number of leaks without curtailing either the period of leakage or the period of supply for consumption. The sanitary benefits of this constant internal pressure, of a pressure always much above that of the atmosphere, rendering impossible the accession of foul matter to the mains which so commonly occurs—when, during intermissions of supply, the internal pressure falls below that of the atmosphere—scarcely admit of exaggeration; and so strongly has this been felt in Liverpool that all new supplies are connected under constant pressure, and except in cases of rare emergency, the water supply is now never cut off from any district or main. Of such a change, in so short a time, Liverpool might well be proud, but when it is known that after paying all the expenses of that change, none of which were charged to capital, a great revenue has been derived from the sale of the water formerly lost through the leakages of which I have spoken, there is cause not only for pride but jubilation. The facts are not difficult to apprehend. Comparing the mean supply of the four years prior to 1874, with 1876, when intermittent service had entirely ceased, and a constant service under increased pressure had taken its place, we find that in 1876 the loss by leakage had already been so far moderated that a supply was given for metered trade purposes, increased by 25 per cent., and unrestricted for domestic and all other purposes to a population already increased by 33,000 persons, with 12 per cent. less water than in the previous period. When to this I add that the revenue went on increasing from additional water sold to new populations and to new trade consumers, who continued to be supplied from constantly increasing savings of the water formerly lost by leakage, you will understand the otherwise inexplicable fact that without any increase in the charges for water, Liverpool continued from the year 1880 up to the year 1889 to pay the interest upon the expenditure, amounting at that time to more than 1,750,000*l.*, incurred in connexion with the great scheme of water supply which was opened and brought into



use in 1892, and so important had the surplus thus realised continued to be that even now, after the expenditure of 2½ millions upon the new works, the charge for domestic water supply—nearly two-thirds of the whole—has only been increased—and that temporarily, I think—by 14d. in the pound, while the charge for manufacturing supplies—about one-third of the whole—has been reduced from 9d. to 6d. in the pound. Never, I believe, in the history of waterworks has a financial condition so satisfactory in all its bearings accompanied the completion of new works the interest upon the cost of which has been defrayed entirely from the revenue of the waterworks undertaking."

Mr. Deacon, applying the moral to London, maintained that our own Metropolis might be similarly benefited. By acting on a trading principle great results had been achieved at Liverpool, and the author was strongly convinced that the water supply of the Metropolis would not be placed on a satisfactory footing until it also was worked entirely on the trading principle and in the interests of the consumers. The conditions demanded by the companies as to the state of the fittings antecedent to the application of a constant supply were in London unnecessarily exacting. There could be no more difficulty in London than there was in Liverpool in detecting waste, and London had more ample power than Liverpool ever had to suppress the waste when it had been discovered. In 1880 London had a chance of obtaining control of the eight water companies by confirming provisions agreed entered into with Mr. E. J. Smith as recommended by the Select Committee of Viscount Cross, but the chance was unfortunately lost soon after when Lord Beaconsfield's Government was overthrown, and a new Select Committee was appointed which reported adversely to the proposals. Since then nothing had been done for the inhabitants of the Metropolis, though the companies had not been idle. By augmentations of capital from time to time, their property now stood at something like 4,500,000*l.* higher than it did at the end of 1879. Had that scheme (Lord Cross's) been carried out, said the author, "there seems to me no manner of doubt that the same sanitary and financial advantages which have resulted from the policy of Liverpool, might with equal ease have been attained some years ago in connexion with the water supply of London. This is no *ex parte* opinion, but the result of a careful comparison of the system of distribution in London and in Liverpool, and many other places, and as I have said of exact experiment, which may be quite easily repeated in any isolated districts of the metropolis, small or large, chosen for the purpose, as was done in Liverpool more than twenty years ago."

The address concluded with an examination of the grounds on which the last Royal Commission on Metropolitan Water Supply based its belief, as expressed in their report, that "not any danger exists of the spread of disease by the use of this water (Thames and Lea), provided that there is adequate storage, and the water is efficiently filtered before delivery to the consumers." It was well known that no filter could attain its full efficiency for some days after the filtering has begun. It must have time to allow of the formation of a thin film of fine mud and gelatinous matter before the filtering process proper commences, and for at least two days the best sand-filter was merely a depositing-tank. In order that the water supply afforded by filtration might be even theoretically safe, it was necessary that this thin film should be maintained without any rupture over 100 acres of filtering surface. But this theoretical safety was based on a mere assumption on the part of the Royal Commissioners, viz., "that filtration would do for the pathogenic microbes what it appeared to do when in its most perfect condition for ever-present river species." Under these circumstances, asks Mr. Deacon, "does it not behoove us to throw our weight against a policy which would substitute for waters such as those of Loch Katrine, of Lake Vyrnwy, or of Lake Thirlmere, other waters, for the supply of our great communities, the bacteriological purity of which has only been negatively determined, the constant quality of which is uncertain, and the origin of which is impure?"

Sir F. S. Powell, in proposing a vote of thanks to the President for his brilliant address, strongly protested against the practice of many public men of subordinating everything to political considerations. Under the circumstances narrated, a new Government had rejected the policy of the outgoing Administration, and upon this question of health the country—London at least—had suffered from that day to this. If there was one thing more

than another that public men ought to bear in mind it was that public health was a large question entirely outside the domain of political controversy (applause). The vote of thanks was cordially adopted.

Papers were read dealing respectively with "Water Supply" and the "Pollution of Rivers" before the adjournment for luncheon, and the afternoon was occupied with the question of the "Housing of the Working Classes," upon which two important papers were read, the last by Mr. H. P. Boulnois, C.E. (Liverpool), the City Engineer.

Professor Henry Robinson, C.E., who read the first paper on "Water Supply," combated the theory that organisms injurious to health derived from sewage decomposition are practically incapable of being destroyed, but admitted that in the application of the Rivers Pollution Act no efforts should be spared to prevent the streams from being employed as vehicles for carrying off sewage or manufacturing refuse.

Professor Hull, in his paper on "The Water Supply of St. Helens," pointed out the remarkable fact that when pumping operations first commenced from sources in the new red sandstone, the supply was greater than it proved to be after a few years. The supply was at its maximum at first because the rock was saturated with storage water, which was an extra source over and above that derived from annual percolation, and which would be exhausted more or less quickly in proportion to the extra capacity of the pumping machinery over and above that necessary to draw off the quantity supplied by the annual percolation due to the rainfall. The water derived from the new red sandstone rock of south-west Lancashire had a permanent temperature of 60° F. both in summer and winter, was pure and wholesome, and contained salts and carbonates of iron, lime, soda, and magnesia, but not in excess.

The paper by Mr. Spinks, Lecturer of the Victoria University, led to an interesting discussion. The author of the paper said the people waited anxiously for the time when our rivers shall be restored, if not to their pristine state, at any rate to a condition which shall in its quality satisfy the most exacting sanitarian, and in its colour be no longer an offence to the least aesthetic amongst us, so that instead of being a plague and a constant danger to health, by day and night, the river shall be a sweetener of an atmosphere which is sadly too polluted from other sources, when rescued from the degrading uses to which it has been allowed to be put by the indifference of some, the ignorance of others, and the neglect of many.

The discussion of the three papers was commenced by Sir Charles Cameron (Dublin), who, in an amusing speech, showed how completely doctors differed as to the extent to which polluted streams were responsible for outbreaks of epidemic disease.

Mr. Alderman Burt (Richmond), a member of the Thames Conservancy Board, described the difficulty which existed formerly of restraining local bodies or manufacturers from polluting the neighbouring rivers. Under the old law of twenty years ago a notice of twelve months had to be given to stop the flow of sewage into a stream. The period had been shortened from twelve months to three months, and the procedure was much more effective.

#### THE HOUSING OF THE WORKING CLASSES.

Mr. Goldstraw (Surveyor of Buildings, Liverpool) sketched the improvements in buildings made in Liverpool since 1842, when the Liverpool Building Act was passed, under the sanitary powers possessed by the municipality. In spite of several Acts of Parliament obtained at various subsequent periods, the condition of the courts and cellar dwellings of Liverpool had reached a climax of badness in 1863, and, until the Sanitary Amendment Act of 1864, compelled all courts of less than 25 ft. wide to be open at both ends for their full width into the public street, not much progress was possible. Nearly a fourth of the population of Liverpool, viz., 112,000 persons, at that time lived in 3,173 courts containing 18,610 houses. A by-law as to open spaces made under the Act was even more effective than the clauses of the Act itself. This by-law prescribed that every new house of two stories in height should have an open yard at the rear or side containing at least 150 square feet, with a distance of 15 ft. across between the back of the house and the opposite property; or the distance across in the case of a three-story house must be at least 20 ft., and for a house of more than three stories 25 ft. This salutary by-law remained in force until 1890; and by that time there had been built in accordance with it about 33,000 houses, which, at five persons

to each house, would accommodate 165,000 persons, or about one-third of the whole population of the borough at that date.

The Public Health Act, 1875, put an end to the construction of cellar dwellings, and none have been since built in Liverpool. By an act passed in 1880 all existing open spaces in connexion with houses were preserved from being encroached upon by buildings except in accordance with certain regulations and a by-law adopted in 1890 introduced two distinctive noteworthy features—1st., the distance across open space to be provided at the rear of every house must be not less than the height of the rear wall of the house, so that the house must not rise above a line drawn at angle of forty-five degrees from the line of the opposite property to the rear. 2nd., the open space required must be each of the three sides about on a similar open space or on a street. The result was that the open space could never be blocked in by adjoining buildings, but must always share in and contribute to the thorough ventilation along the rear of all the adjacent houses. The Artisans Dwellings Acts in operation were too numerous and complicated to be treated of in the paper.

The City engineer, Mr. H. Percy Boulnois, prefaced his paper by pointing out the fact that the lecture of Dr. Longstaff was followed by two papers on the same subject. It was a mere coincidence. They were not acting in collusion, and therefore it showed that this subject was filling many minds. The paper dealt with eight types of dwellings built in blocks and flats, which are termed "tenement houses," for the occupation of artisans. Facts, mainly drawn from Liverpool, were put forward rather than opinions, the author premising that the tenement houses of not more than 20*l.* a year rent might be considered the "working classes," and that the rent to be paid by the poorest of the ought not to exceed 1*s.* per room per week. It was urged that persons of the working class could not possibly pay more than one-fifth of their income in rent, including rates and taxes, and labourers earning perhaps 1*s.* 6*d.* or 2*s.* a-week must be housed for 1*s.* 6*d.* or 4*s.* per week. Many letters had been written to him protesting against the Corporation allowing the erection of the four-room cottages of the now prevailing type, on the ground that even working men's families could not live decently in houses with such limited accommodation. In response to this suggestion it can be said that there were many families which could not require more than two, or perhaps three ordinary rooms for reasonable conditions of decency and health, and many more which could not possibly pay a greater rent than those two, three rooms must of necessity command.

An experienced architect in 1865 designed a built for his own investment a block three stories high containing fifty-one tenements of four medium-sized rooms let at from 4*s.* 6*d.* to 5*s.* 6*d.* per week. They have a continuous balcony the level of each floor, and a large open space at the rear. On this space wash-houses were erected. But neither the common yard nor the wash-house were used as intended. The one was a harbor for filth, and the others have fallen to ruin. The tenants could not agree in the joint occupation to 10 per cent. of the houses were unoccupied.

The same result was given by six blocks erected by the Corporation in 1868, and let at rent averaging 1*s.* 3*d.*, 1*s.* 4*d.*, and 1*s.* 5*d.* per room. The most typical cases were two large blocks built very near to the line of docks at the north end. Each block occupies the whole of one side of a street which opens at each end into the main road where tramways are laid. No conditions could be more favourable. A large common open space was provided at the rear of each block. Each of the three stories formed a separate "flat," and had a continuous balcony running along the front. Every house consisted of living room, three bedrooms, and a scullery with other convenient places, making practically five-roomed tenement. But even if we reckon it as having only four rooms, it would be found that as the rents were 5*s.*, 4*s.* 6*d.*, and 4*s.* 3*d.* according to the height, the rate per room was but 1*s.* 3*d.*, 1*s.* 1*d.*, or 1*s.*, as the case might be. And as the rent includes a free gas supply worth 3*d.* per week, the rate per room actually reduced to 1*s.* 2*d.*, 1*s.* 0*d.*, and 11*d.* Surely, it will be said, here was a success. Unfortunately, the facts told a different tale. Whether it is that the houses are practically large for the wretched class of tenants, who might prefer a two-roomed house or half-a-crown a week to a four-roomed one at 4*s.*, or whether the property generally was rather unattractive from

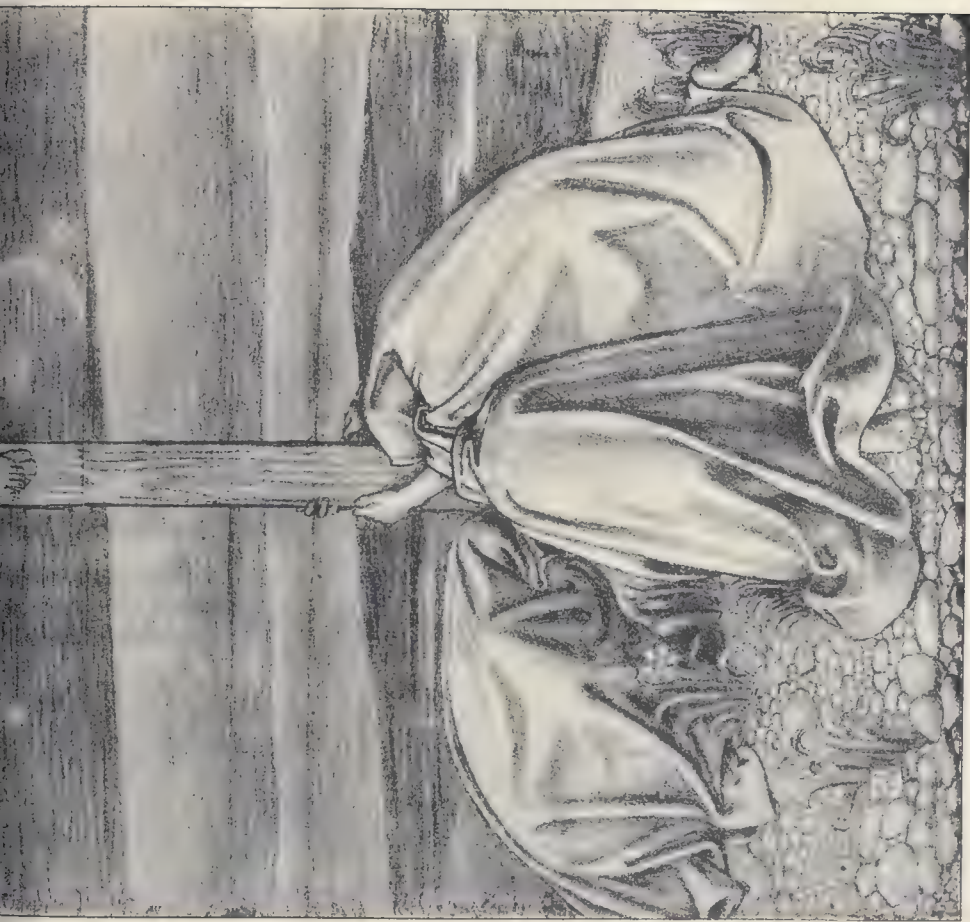




THE BUILDER. OCTOBER 6, 1894.







CARTOON FOR ALTAR-PIECE—By Mr. G. Woolfscroft Roper.

*Royal Academy Exhibition, 1894.*



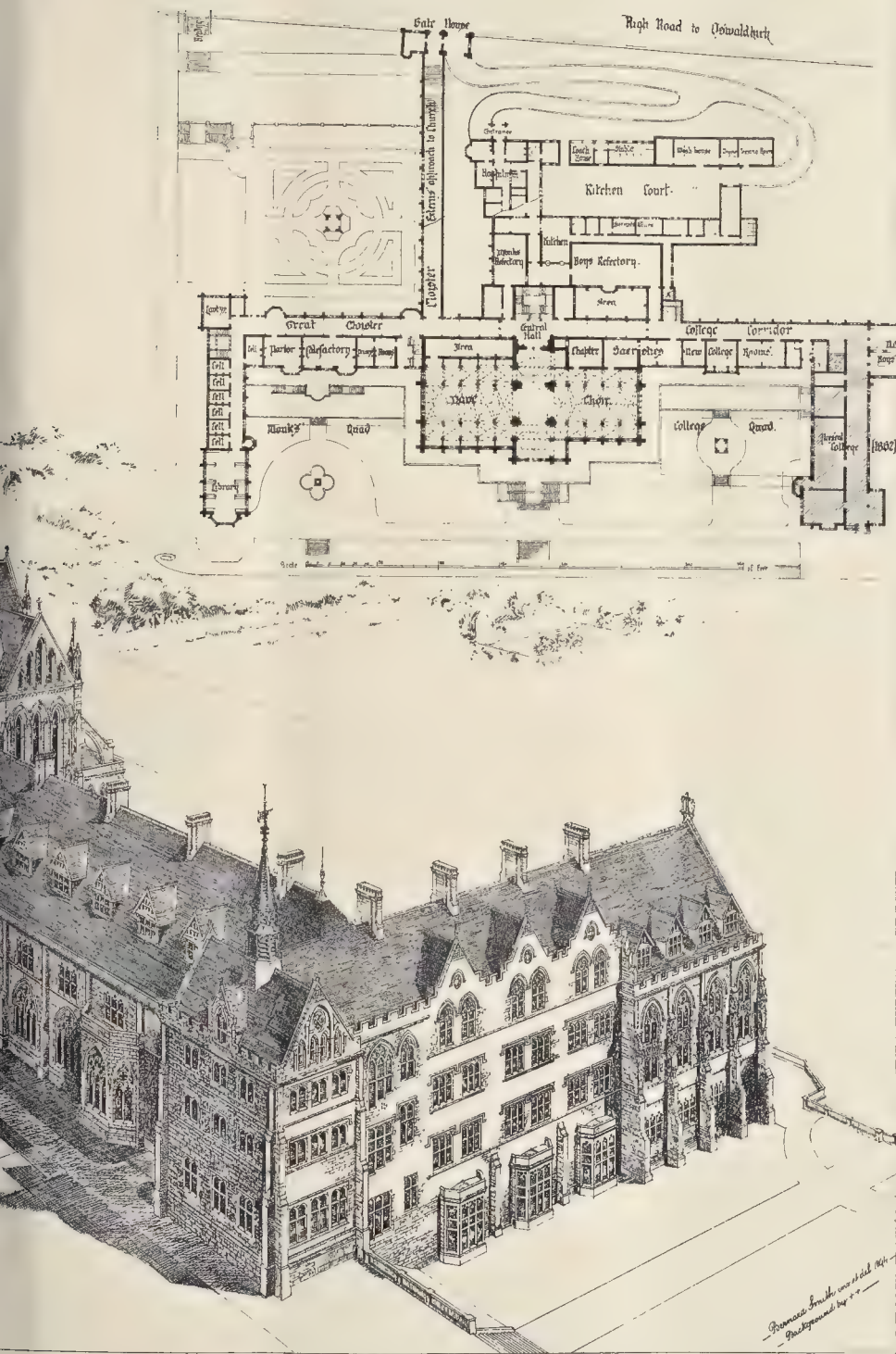






Birds-eye View from North West of the  
New Monastery and Collegiate Buildings  
St. Lawrence, Ampleforth, York.



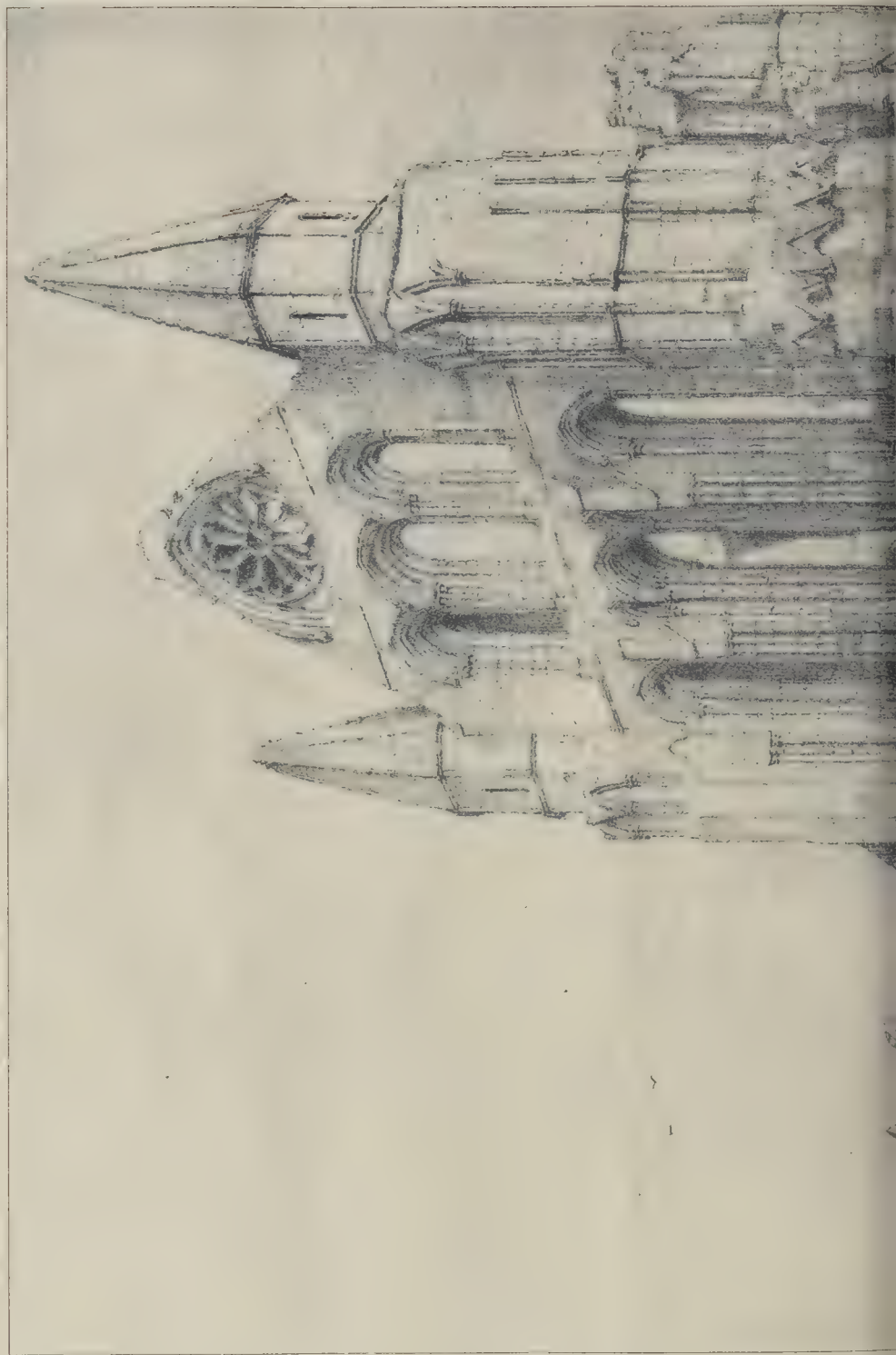




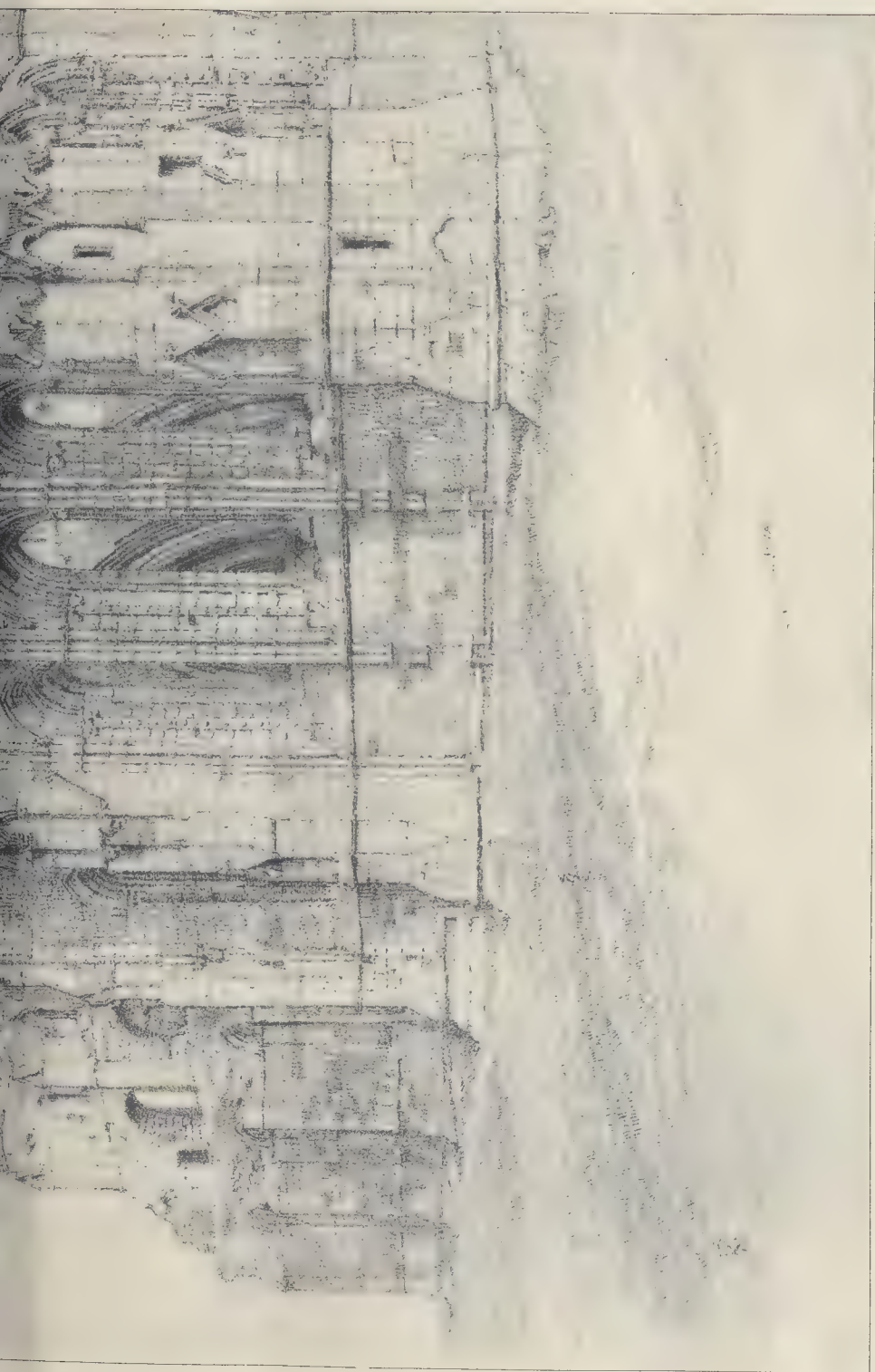




THE BUILDER, OCTOBER 6, 1894.







THE ABBEYS OF GREAT BRITAIN.—No. 5. WHITBY.

DRAWN BY MR J. A. SLATER

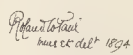
















of repair—not a strong reason with such tenants—the houses “let” badly. Out of 180 rents in the street, there are 41, or only 23 per cent., which are unoccupied, and many of which have apparently been so for years at least. Almost all the houses were dirty and somewhat disreputable-looking. The fine open spaces at the rear were of no advantage either drying-grounds or playgrounds. They were places for refuse and ruffians. The tenants could not even keep the open space clean, and it had to be scavenged by the Corporation. The experiment is therefore a failure.

Two other attempts to provide dwellings in blocks were made by the Corporation in 1883 by the erection of the Victoria-square Dwellings on a cleared of insanitary property by compulsory demolition, and in 1887 by the erection of four blocks on the opposite side of the same street, in premises designed of eminent architects. In the first case the average rents per room are 8s., 2s., and 2s. 6d., and the Corporation are to secure a 2½ per cent. return. In the second experiment good inexpensive dwellings on a block system have been provided, and the Corporation receives about 3½ per cent. interest, and the rentals are—for two rooms, 4s.; one room, 2s. Therefore the desired shilling rate has not been nearly reached. The conclusion is that, as far as the ordinary builder is concerned, the past experiments have been failures. The dilapidated and dirty condition of the tenement blocks which are in the hands of individual owners, and the losses which those owners undoubtedly suffer from low-class and unmanageable tenants, point to the conclusion that such blocks should be owned and managed by powerful bodies, companies or corporations, who could and would keep both the buildings and the tenants in fairly good order. The cheapest of cheap dwellings unquestionably wanted; they can only be supplied by the strongest of strong hands. In conclusion, the author added that he and the Surveyor, Mr. Goldstraw, has been equally surprised to find that this kind of property did not pay.

#### Discussion.

Sir F. S. Powell, who opened the discussion, said they were dealing more with minute technicalities than with the general features of the case, and it had been made clear that the results of the experiments so far made were not of an encouraging character, and that the cost of providing dwellings in which the poorest of our people could live in decency, not to say in comfort, was too high for their wages. Parliament had given power to the municipalities to erect new buildings, but had at first given them no power to borrow money for the purpose. Although this difficulty had, during the last Session, been removed, he doubted very much whether it would be possible to make the construction of such houses so remunerative as to attract private capital.

Dr. Sykes (Medical Officer of Health of St. Pancras), referred to the aspect of this perplexing question in London, where half-a-dozen large companies were engaged in trying to solve it, and the experience was the same. The large blocks did not pay 3 per cent., and the London County Council had been obliged to increase the price of the dwellings because they could not pay the 3½ per cent. interest on the money laid out. In London no one would venture to fix so low a rate as 1s. a room. The question was more than a question of cost of land, it was a question of the amount of accommodation to be given. Were four rooms necessary? By means of what Mr. Blashill had felicitously called “co-located” houses was it not possible to reduce the necessary accommodation to one room? Under present conditions three rooms was the minimum number in London. They must have a living room, one or more bedrooms, a scullery and washhouse. The minimum rent at 2s. 6d. a room would be 7s. 6d. per week. If Liverpool did not make these houses pay, how much less was there of London doing so?

Mr. H. Collins (District Surveyor, City of London) who said he had special experience of the class of buildings, thought that in Liverpool there must be gross mismanagement somewhere, and could point to a large number of such buildings paying four or five per cent. interest. He said the architect of blocks of buildings in Canonry and Deptford which paid from six to seven per cent. The return was a matter that depended on the management. In a block of dwellings in which three families resided if a child of any of them damaged a brick, the whole of the families were warned that if it recurred they would all have to go. The warning was general. Mr. Vigors, of the Peabody Fund,

had gone into an elaborate investigation to ascertain the lowest rent which could be demanded, and he found that it was 1s. 10½d. per room. A client of his was about to invest 30,000l. or 40,000l. under his direction in such property, not from philanthropic motives but for investment. On the Rothschild property the dividend paid was 4 per cent., at Waterloo 4 per cent., East London 4 per cent.

Dr. Sykes.—Out of capital?

Mr. Collins.—The Rothschild's are not the kind of people to pay dividends out of capital.

Mr. C. S. Pain (Liverpool) protested against the heretical opinions he had heard broached in this Congress under the *agis* of the Sanitary Institute. He had just heard philanthropy spoken of as discreditable. One sapient president had suggested a return to back-to-back houses, another sanitarian advocated that abomination the slop-closet, and now we were all to live in one room. Was it not time for the Sanitary Institute to disclaim such insanitary teachings as these?

The President reminded the meeting that the President of the Conference of the Engineering Section who had referred to back-to-back houses was not an officer of the Sanitary Institute. He had no hesitation himself in saying that it was impossible to construct back-to-back houses with due regard to sanitary principles.

Mr. Goldstraw and Mr. Boulnois severally replied, the latter adding his absolute condemnation of back to back houses. He agreed that it was an unfortunate circumstance to have been told in that room that a back to back house could be made sanitary.

#### OTHER SECTIONS.

The most important papers read in other sections were one forwarded by Sir Douglas Galton, and read by Dr. Sykes, on “The Teaching of Hygiene in Schools,” and one read by Mr. Alderman Burt, on “The Laws relating to the Acquisition of Land for Isolation Hospitals,” &c.

## Illustrations.

### WHITBY ABBEY.

THE beautiful fragment of the Benedictine monastery at Whitby takes a foremost place both for its architecture and for its position. Raised as it is over 200 ft. above the sea, the grandeur of its architecture is greatly enhanced, and, although but a comparatively small portion remains, its detail will compare with the finest examples of Early English and Decorated work. The original foundation was that of a nunnery, by King Oswy of Northumbria “in fulfilment of a vow made before his great victory over the heathen King Penda of Mercia, November 15, 655, near Seacroft, on the banks of the Aire,” of which St. Hilda, niece of King Edwin, was the first prioress. It was refounded as a monastery by William de Percy in the time of the Conqueror. The present buildings, however, are later in date. No Norman work remains, and the whole of the eastern arm and the transepts are Early English, with very pure and beautiful detail. Part of the nave is of this date, and the other parts Decorated.

From its exposed position on the summit of the cliffs, it has suffered severely from storms, and within the present century large portions of the church have fallen. The south transept fell in 1763, the west front fell in November, 1794, the central tower (shown in old engravings) on June 25, 1830, and during a storm in 1839 a portion of the choir was destroyed.

When complete the church consisted of a nave of eight bays with aisles, transepts projecting two bays beyond the nave and choir, with eastern aisles, a central tower rising one story above the ridges, and an eastern arm of seven bays with aisles. The present remains consist of the eastern arm fairly complete, but with its south aisle and part of its south arcade and clearstory destroyed; the north transept fairly perfect, except in its clearstory; one column of the central tower, and the north portions of the north aisle wall of the nave, and west end. One column also of the north transept arcade is still standing, and another column in the nave inscribed, “L. Smelt. Arm. Erexit A.D. 1790.”

There are four periods visible in the present remains. The whole of the eastern arm is of the first period of Early English, including apparently the central tower column. The north transept is also Early English, but more fully developed and more elaborately ornamented, and the first three bays of the nave are apparently of the same

period. The remaining five bays of the nave and the west front are of very beautiful Decorated design, and the Perpendicular period is represented by the great west window and the west window of the north aisle. With the exception of the inscribed column already alluded to, nothing of a more recent date remains.

The whole of the site of the nave and central tower is filled with large masses of fallen masonry, and the destruction of these portions of the church has been very complete.

Returning once more to the choir, the whole of this and of the transept has been lighted by lancets. Three tiers of triplets form the design of the east end, flanked by turrets square below, and becoming octagonal when clear of the roofs. These turrets contained staircases leading to the choir roof, approached from the triforium level. The presbytery arcade consisted of deeply-moulded arches standing on clusters of eight columns, the lower member of the plinth being of octagonal form. The eastern respond was of a slightly different form. Above the arcade was a triforium—two lancets under a semi-circular enclosing arch, the lancets themselves being subdivided. The clearstory was a single lancet flanked by two blind arches on either side. The central aisle was not vaulted, but the aisles were, and the north aisle, with the exception of one bay, retains this vaulting in fairly perfect condition. On the exterior shallow pilaster buttresses divided the bays of the clearstory, and buttresses with bold projections and chamfered angles divide the bays of the aisles. Single lancets light the aisles, the interiors having nook-shafts. There is a severe simplicity throughout this portion of the church, there being no carving, except on the corbels of the shafts which supported the roof principals, and in the spandrels of the triforium arches. There are traces of altars at the eastern end—one in each aisle, and two in the centre. Three aumbries remain, and are shown on the plan. The column of the central tower which remains—that at the north-east angle—is a clustered one of fifteen shafts. It remains only to the springing level, and its base is buried in debris.

The north transept is a very beautiful design, later in period than the choir, but retaining many of its features most elaborately worked out. The northern end has, like the east end of the choir, three tiers of lancets, and above, in the gables, an elegant wheel-window, set in an outer order of triangular form. Turrets flank the central gable. The eastern aisle has a single lancet at its north end, two lancets on the east side of the northern bay, and a single lancet in the southern one. There is an aumbry in the arcaeing in the north wall of the aisle, and distinct traces in the east wall under the windows of the altars which formerly stood here. The inner face of the north and west walls of the transept are arcaded—trefoil arches, with quatrefoiled circles in the spandrels—but the detached columns which supported them have been destroyed. Among other evidences of a later period is the carving of the caps in many instances, and the enrichment of the arches with dog-tooth ornament. The exterior of this transept the Abbey was approached from the north-west—was of an elaborate description, and the buttresses on their northern and western faces were ornamented with canopied figures. The figures have disappeared, but many of the canopies remain. There was a doorway in the north-west angle leading to the staircase in the turret, and in the upper portion of the north-east turret was a similar staircase. What remains of the three eastern bays of the north aisle of the nave show it to have been probably of the period of the transept. It was vaulted, and had a single lancet in each bay. The buttresses are not central on the outside, and although the upper portions have evidently been rebuilt, they do not bond with the main wall; the plinth itself remains and shows them to be in their original position. Of the remaining five bays of the nave aisle the wall and windows remain of the first two westward of the Early English portion. Each bay is filled by a large four-light Decorated window, of very beautiful design, with tracery in the head of that type known as “Kentish,” and ornamented throughout with delicate carving and mouldings. The next bay has a doorway of three orders, the inner order trefoiled, and from evidences on the exterior there seems but little doubt that the space between the buttresses was vaulted over and formed a porch to what was one of the principal entrances of the church. Of the remaining two bays, sufficient remains to show that they had windows of the same character as the two still standing. There are traces of a stoup on the western side of the doorway.



The west front of the church has fared badly, and from the soft nature of the stone has crumbled more than the other portions. But sufficient remains to give some idea of the grandeur of the design. In the centre, set between two boldly-projecting panelled buttresses, was a large doorway of five orders, with rich mouldings and carved caps. The inner order was apparently sub-divided (as in the case of Croyland, shown in our view of that Abbey in *Builder*, September 1st) with a central shaft and double doorways. The inner face of the walls was panelled. Over this was a large west window, an insertion in Perpendicular times, and transomed. Flanking the window were staircase turrets communicating with the roof and with each other by means of a passage across the splay of the window.

There were also similar passages in front of the aisle windows, communicating with the turrets at the angles of the aisles, which had staircases, approached by doorways in the angle, leading to the aisle roofs. The west windows of the aisles were of three lights, likewise Perpendicular insertions. That on the north side remains in fairly good condition.

One of the strongly-marked characteristics of this building, clearly shown by the ground plan, is the considerable divergence of the nave from the line of the transepts and eastern arm. We know, of course, that many instances occur—Bristol Cathedral (given in our Cathedral Series) was a case in point. At Bristol it was the rebuilding on earlier foundations, and possibly it may be the same at Whitby. Nothing in the site at Whitby would seem to have rendered such a treatment necessary, and it remains as a somewhat remarkable instance of orientation. The bases of the columns, shown in outline on the plan, do not at present exist, but it has not been a matter of difficulty to complete the plan of the church from what remains with accuracy.

The monastic buildings have entirely disappeared. Much stone from the Abbey has doubtless been used for neighbouring buildings, notably for the building known as the Abbey House, situated south-west of the church, built by Sir Francis Cholmley, about 1580, and dismantled about 100 years back on account of serious injury to the structure by storm.

The stone used in the Abbey Church is of two kinds—a brown and a grey sandstone. Both have been used without apparently any very definite scheme of colour having entered into the minds of the builders, but in the early portions—the choir and transept—the use of the grey stone predominates for exterior work, and from its greater durability has stood the effects of time and weather better than the brown. This latter has been more freely used in the Decorated work of the nave, and consequently its detail is badly preserved. Both stones seem to have been used in about equal proportion for the interior.

The total internal length of the church is 283 ft., the breadth across the choir 62 ft., the breadth and projection of the north transept 44 ft., and 36 ft. respectively, and the breadth of the choir 62 ft. There are no monuments remaining.

#### ST. LAWRENCE'S MONASTERY AND COLLEGE, AMPELFORTH.

The illustration shows bird's-eye view from the north-west of the scheme of proposed new buildings at St. Lawrence's Monastery and College, Ampleforth, as revised from the competition plans published in a previous number.

The part being proceeded with at present is the south block of the monastery, extending from the church up to the return west wing, forming the west side of the monastery quad.

The foundation-stone was laid in July last by the Bishop of Newport and Monmouth.

The new building will provide twenty-five monks' cells, monks' calefactory, lecture-rooms, music-room, work-rooms, and large (temporary) library, &c., lay brothers' calefactory work-rooms, &c., &c.

It will be seen from the plan that the west wing when built will provide further cell accommodation (for forty monks altogether), lecture-rooms, &c., and the large monastery library at the end of the wing.

The south block on the east side of the church extending from the church up to the present college buildings, built in 1862 (shaded on plan) will be appropriated to further extension of the college—new class-rooms, libraries, and play-rooms, and a large additional dormitory for fifty more boys.

The new refectory for the boys and the monks'

refectory are placed at the back, adjacent to the new kitchen and servants' offices.

The approach from the Hospitium (Guest House) to the monastery, college, and church is by the Hospitium corridor down the grand double staircase to the central hall (43 ft. by 31 ft.) opposite the north transept and entrance to the church, and whence the monastery, cloister, and college corridor (together over 500 ft. long) branch off to west and east.

The plan given hardly shows this very clearly, being an attempt to show the ground floor of Hospitium and the general ground floor plan together; whereas the Hospitium ground floor is 20 ft. above the ground floor level of monastery and college.

The approach for "Externs" (from the village) and for servants, to the church is by a separate corridor (over the cloister shown in view running north up to the high road) cut off altogether from access to the college or monastery enclosure.

The monks at Ampleforth are of the Benedictine order—the order to which we owe most of our old cathedral churches, and their house claims descent from a continuous tradition with the pre-Reformation Benedictine Abbey of St. Peter at Westminster.

When the last Abbot was sent to the Tower in Queen Elizabeth's reign, and his monks driven from Westminster, some of them settled at Dreulworth, in Lorraine, and resumed their monastic life. There they remained till the French Revolution drove them and all religious orders out of France. Under Prior Appleton they eventually settled down at Ampleforth in 1802, in the old manor-house.

The old buildings, which have been gradually extended since that time, are now doomed to give way to others more suitable and worthy of the better prospects and position of the Monastery; and the Church, though only built about thirty years ago, is not now thought good enough for the wants or ambition of the monks.

An entirely new church, on a larger scale altogether, is shown in the perspective view.

The architect is Mr. Bernard Smith, of London. B. S.

#### CARTOON FOR AN ALTAR-PIECE.

This drawing, by Mr. G. Woollicroft Rhead, occupied a central and prominent place in the Architectural Room at the last Royal Academy Exhibition. It was a design made for the exhibition only, and has not as yet been carried out.

As an attempt to treat the tragic subject of the Crucifixion in what is called a decorative manner, while suggesting something more than mere decorative effect, it is, we think, very successful. The level bars of landscape and cloud contrast effectively with the upright lines of the main composition, and give at the same time an expression of solemnity to the whole. The kneeling figures almost entirely hidden in drapery were perhaps suggested by Flaxman's not infrequent treatment of the figure in this manner.

#### COMPETITIONS.

BURNLEY, LANCASHIRE.—In a limited competition for proposed new Congregational Church and school extension in Hollingreave-road, Burnley, the committee, with the assistance of their assessor, Mr. Dawson, F.R.I.B.A., of Lancaster, awarded the first premium to Messrs. Hitchon, Son, & Lancaster, architects, Burnley, and the second to Mr. J. T. Landless, architect, Nelson. The school extension is placed under the chapel, and consists of eight class-rooms and one larger room, with the necessary conveniences. The chapel proper will be 72 ft. by 45 ft., with shallow transepts at the north end, and gallery over the south end. The seating accommodation is reckoned at about 650. The committee have already met and instructed the architects to prepare the working drawings.

#### ARCHITECTURAL SOCIETIES.

THE MANCHESTER SOCIETY OF ARCHITECTS.—The first meeting in the session of 1894-5, was held at 36, George-street on the 2nd inst., and the President, Mr. John Holden, F.R.I.B.A., F.S.I., delivered his address to the members. After reviewing the proceedings connected with the reconstruction of the society in 1891, which had resulted in a large increase in the membership, which now numbered 135, he urged the members generally to assist in carrying out the objects of the society, and by close attention to the rules and regulations to minimise the labours of the honorary officers. He then

paid a kindly tribute to the memory of those gentlemen who had been removed from the roll of members by death, viz.:—Messrs. John Elgood, Joseph S. Crowther, William Charles Tuke, James Maxwell, and Lawrence Booth, all good men, whose loss would be especially felt by the older members of the society; also of Mr. J. H. P. Leresche, Barrister-at-Law and Stipendiary, who had for the last ten years occupied the position of Honorary Legal Adviser to the society. At the same time he informed them that the council had nominated Mr. William Goldthorpe, Barrister-at-Law, as his successor, and that he had accepted the appointment. After briefly touching upon the question of competitions, of builders depositing prices, quantities for works to be carried out, and other matters, he also said that he hoped before long to see a Chair of Architecture founded at the Victoria University; this would be a great advantage to the students, and he advised them by increased efforts to show that this would be appreciated by them. He then addressed the senior members, strongly urging them to contribute to the education of the younger members by reading papers, by giving information on matters connected with the profession, and by supplementing the books in the library, especially referring to the very generous gift of books by Mrs. Whitaker, the widow of the late William Wilkinson Whitaker, architect, of Manchester. In addressing the younger members, the President urged them by careful study, and by passing the necessary examination of the Royal Institute of British Architects, to qualify themselves to, in their turn, take office as Presidents or Vice-Presidents of this Society, and to carry on the work which has for the last thirty years been going on, and which has given the Society the first place out of London. The President afterwards delivered the prizes which had been awarded to the students for work during the past session, the principal prize of books of the value of ten guineas, for the most satisfactory progress made by the Society's students in the architectural classes arranged by the Council with the committee of the Technical School, being awarded to John Ormrod, and the second prize of five guineas being divided between William S. Beaumont and Alfred R. Parker, whilst the other prizes respectively were given to A. E. Corbett, J. C. Dewhurst, Isaac Taylor, and T. W. Hoolbush.

GLASGOW ARCHITECTURAL ASSOCIATION.—The monthly meeting was held on Tuesday evening in the rooms 114, West Campbell-street, Mr. A. N. Paterson, President, in the chair. Mr. Wm. Fraser, A.R.I.B.A., read a paper on the "Planning of Country-Houses," being a continuation of the series of essays on planning contributed by members during last session. Treating the subject in the wider meaning of the term, and dealing with cottages and villas, as well as the larger country-houses, he emphasised several matters to be attended to in the planning of cottages for labourers, pointing out that three or four rooms, consisting of a living-room, sleeping-room for parents, one for boys, and one for girls are necessary for the requirements of decency. Passing to a description of villas and larger houses, he mentioned how difficult it is to say absolutely what are the exact requirements of a country-house, as the plan is greatly influenced by the particular ideas of a client, and by the amount of money he is prepared to spend. The chief point to be considered was the situation of the inhabited rooms from the working part of the house, its convenience and compactness, light and air, aspect and prospect, all of which taken together tend to make a comfortable home. The essayist then touched more particularly on the different apartments of a house, describing in some detail the sizes, requirements, and position in relation to one another. He strongly advocated the use of the hall in small houses as a living room, thereby saving the space occupied by the ordinary lobby.

DISCOVERY OF A ROMAN VILLA NEAR CARDIFF.—There have lately been discovered, on the Elan-estuary near Cardiff, the remains of an extensive Roman villa, which are being uncovered by the Cardiff Naturalists' Society. The results so far described as being most satisfactory, and prove the existence of prehistoric dwellings, upon the foundations of which a large and important Roman villa was erected. There are indications also that the villa was built upon its foundations. The remains of the walls at present discovered are of great thickness and solidity. Among other articles unearthed were flint arrow-heads, large quantities of tesserae, fragments of Samian ware and black pottery, a considerable quantity of coloured and figured wall-plaster, Roman coins of various dates, fibulae, and broken glass.



## Books.

*Notes on the Testing and Use of Hydraulic Cement.*  
By FRED P. SPALDING, Assistant Professor of  
Civil Engineering, Cornell University, Ithaca,  
N.Y. Ithaca: Andrus & Church, 1893. Pp.  
vi. and 108.

**T**HIS little book is, according to the preface, "designed for use as a text-book, in a short course of instruction, as well as to serve the purpose of a hand-book in the laboratory." The nature and properties of cements are briefly and carefully described in the first chapter, but we must take exception to the statement on page 20, running thus, "When the cement is finely ground and the sand of good quality, a mortar composed of equal parts of each will, as a general thing,\* finally attain a strength as high as, or higher than, that of the neat cement." Experiments have shown that an increase of strength does accrue through the addition of a small proportion of good sand or of coarse cement grains, but not to the extent stated by Mr. Spalding. Chapter II. is entitled "Cement testing," and contains articles on "Objects of testing, weight and specific gravity, fineness, rate of setting, tensile strength, ordinary tests for soundness, accelerated tests for soundness, chemical analysis, compressive tests, adhesive tests, microscopic examinations, abrasive tests, and air-slaking." Forty-seven pages are devoted to this chapter, and of these no less than sixteen are occupied by the article on tensile strength; the other subjects are therefore treated with a brevity which, in some instances at least, ought to have been avoided. For instance, in the sections on adhesive and abrasive tests, nothing is said as to the results which good cement ought to give when subjected to these tests; the student, therefore, is left quite in the dark as to what standards he ought to adopt in practice. Again, we are simply told that "the compressive strength of mortar is commonly stated to be about ten times its tensile strength, although there is of course a considerable variation in the actual ratio." It would have been more satisfactory if the author had said that the mortar, of which this common statement is made, is a 1 to 3 mixture of cement and sand, and that the ratio between tension and compression varies between 1 to 7 and 1 to 20. No figures are given to show the effect of different proportions of sand in mortar, and the converse strength of cements and mortars is not mentioned at all. Two statements of the author as to the adhesive and cohesive strength of cement, although they are not quite contradictory, yet do not bear juxtaposition; on pages 24 and 25 we read:—"It has been found in general that the cohesive and adhesive strengths vary in somewhat the same manner for different material, and the determination of cohesive strength is commonly relied upon as a test of value," while on page 71 we read—"It is to be observed that the adhesive strength is not necessarily proportional to that of cohesion, even when the fineness is the same, and that different varieties of cement may possess the property of adhesion in quite different degrees." Mr. Mann's experiments, we may observe, showed that the ratio between the adhesive and cohesive (or tensile) strength of neat cement varied from about 1 to 5 to 1 to 9 at seven days, and from 1 to 3 to 1 to 5 at twenty-eight days. Chapter III. is entitled "The Use of Cement," and extends to nineteen pages only. The section on the freezing of mortar is somewhat unsatisfactory, but the subject is fraught with difficulties, and the final word cannot yet be spoken on it. Chapter IV. consists of a list of periodical literature relating to hydraulic cement, which, although not exhaustive, will prove extremely useful to the student. In some parts of the book there is, as we have already indicated, a certain lack of definiteness, but on the whole, we can recommend the work as a clear and concise statement of the main facts relating to the testing and use of hydraulic cement with which the student ought to be acquainted.

*The Practical Designing of Structural Ironwork.*  
By HENRY ADAMS, M.Inst.C.E. London:  
E. & F. N. Spon, 1894.

THE system of employing large quantities of iron and steel in modern buildings is now so much adopted that it becomes desirable for architects to be acquainted with those principles upon which the design of girders and columns are based.

In America, where this method of construction is so extensively used, the ironwork required is often of such a complicated character, that good designs can only be prepared by those who have

made this branch of the profession a specialty, but in this country the work is generally of such a simple nature that anyone having but a moderate knowledge of the subject would be able to do all that is required.

At intervals, during the last ten years, the author of the above work has issued small pamphlets on the calculations and designs of ironwork for simple structures. These were prepared for the use of the students in the Engineering Department of the City of London College, and as they have proved of considerable use to engineers and architects in actual practice, Mr. Adams has now republished them in one volume, adding several new notes and other information relating to the subject.

The author commences by showing how to make all the necessary calculations for a cast-iron girder, and for a fitted beam. After describing various kinds of riveted joints he proceeds to show how to prepare the working drawings for a wrought-iron plate girder to support a load of twenty-five tons distributed over a span of 20 feet. Besides these examples there will be found complete information on designing cast-iron columns, small lattice girders, and wrought-iron roof-trusses. The calculations necessary to proportion all parts of these structures are always clearly given and explained, and followed in each case by a working drawing, so that the student is able to see how the formulae he has made use of are applied in practice.

The book will recommend itself to those commencing the study of ironwork, because it is written in a thoroughly practical manner, and as each division of the subject has a chapter to itself, it is not necessary to master the whole work before any of its contents can be applied.

It was not the aim of the author to produce a book dealing with difficult ironwork, but it will be found he has omitted but very little that is likely to be of general use in the office of an engineer or architect.

*Designing Ironwork.* By HENRY ADAMS, M.Inst.C.E. London: 60, Queen Victoria-street, 1894.

IN the first series of pamphlets published under a similar title the author only dealt with ironwork structures of a comparatively simple character, suitable for explaining the principles of practical designing to those commencing the study of this subject. In the second series now being published the author proposes to show the method of designing work of a more advanced type, and the first part, consisting of some twenty-six pages, is wholly occupied with the calculations and working-drawings of a steel box-girder, having an effective span of 50 ft.

Everything that is necessary for the student to know to enable him to design a girder of this kind is clearly explained, and there would be no difficulty in constructing the work from the information on the drawing given by the author.

*Stresses in Girder and Roof Trusses.* By F. R. JOHNSON, A.M.Inst.C.E. London: E. & F. N. Spon, 1894.

IN this book the author has attempted to simplify the calculation of stresses in lattice girders and roof trusses by giving stress constants for both dead and live loads, which only require to be multiplied by the panel load to give the maximum stress in any member of a truss.

We think that most engineers and architects who have such structures to design will prefer to make their calculations, step by step, in the usual way; when these are made, however, they can be rapidly checked by the many tables given in Mr. Johnson's book.

*An Introduction to the Differential and Integral Calculus.* By MATTHEW WYATT. London: Whittaker & Co. 1894.

THIS little book has been written for students reading without the aid of a tutor, and the author has, therefore, fully worked out all the examples given to illustrate the subject.

A very moderate acquaintance only with this branch of mathematics often proves of great value to the scientific man, and as Mr. Wyatt explains the fundamental principles in such a simple manner, anyone with a little trouble could in a short time learn quite sufficient from his book for most practical purposes.

*A Handbook of Ornament; with 300 Plates, &c.* By FRANZ SALES MEYER, Professor at the School of Applied Art, Karlsruhe. Second English edition, revised by HUGH STANNUS, F.R.I.B.A. London: B. T. Batsford, 1894.

MR. STANNUS states in his preface that his chief

object in editing the English translation of Herr Meyer's book has been to revise the terminology, and to render it more clear for students, without any alteration and addition which would seriously interfere with the original author's work.

That the English translation of Herr Meyer's book has been appreciated in this country is evident from the fact of a second edition being called for. As an analysis and classification of the various forms and applications of ornament it is remarkably full and comprehensive, and should be a very useful book for study or reference, though we do not think anyone will be stirred by it to artistic enthusiasm, or will be helped towards becoming an artist by the study of its pages. Like some other German works on ornamental art, it is full of information but evinces little artistic feeling; there is a hard mechanical character about the majority of the illustrations which is not calculated to attract the English student, however it may appeal to the German. Some of the most beautiful schools of ornament—Indian, Saracenic, and Byzantine, for instance—hardly seem to be illustrated at all; and the illustrations contain a great deal of very bad ornament, the badness of which does not seem to be evident to the mind of the author, and of course is not pointed out to the reader. In short, no one is likely to be made an artist by the study of the book, though it gives a learned if not quite complete historical résumé of various types of ornament.

*Les Saint-Aubins.* Par ADRIEN MOREAU. Paris: Librairie de l'Art. 1894.

THE Saint-Aubins, of whom M. Moreau gives us a biographical sketch with a number of illustrations of their designs and portraits, were designers mainly of ornamental work, head-pieces, &c., in the pretty but affected French style of the eighteenth century. This at least seems to have been the principal work of Augustin Saint-Aubin, varied by fashionable portraits and occasional representations of ceremonial scenes. There are three of the family whose works are illustrated: Charles-Germain, Gabriel, and Augustin, the latter being the most important and the most largely illustrated. There is a good deal of interest in some of the scenes illustrated, from the point of view of the social historian. The decorative designs have an old-fashioned grace and fancy of their own, but are in a style the interest of which at the present day is chiefly historical. We may be grateful, however, for a book giving us some information about a family of French artists of the last century about whom little is known in England.

## Correspondence.

To the Editor of THE BUILDER.

## THE NEW LONDON BUILDING ACT.

SIR,—I have read with much interest, and I may add, with much satisfaction, your leading article upon the London Building Act, 1894. There is, however, one passage to which I must take exception, since you are evidently under a total misconception as to the facts.

Alluding to those portions of clauses 13 and 41 which exempt from the operation of the clause "dwelling-houses to be inhabited or adapted to be inhabited by persons of the working class," you go on to say: "These provisions we take to be in reality bids for the working-class vote on the part of the Council. That such bids should be made on the part of a body of such political prejudices as the London County Council has turned out to be need surprise no one; but that they should be solemnly incorporated in an Act ostensibly designed for the general public welfare is contemptible." That such insinuations should be made against the Council is the not unnatural result of its past actions, but that in the particular instance the accusation is wholly unfounded I most positively assert. As the instructions to the draughtsman have all passed through me, I am in a position to know the facts, if anyone is. Briefly, the history of the matter is as follows:—

The deposited Bill treated all domestic buildings alike, but the provisions as to open space at the rear of houses met with such a storm of opposition from architects and surveyors, especially gentlemen connected with large London estates, and of great eminence in their profession, that it was felt to be hopeless to attempt to carry the Bill in that form. We pleaded that the "Housing of the Working Classes Act, 1890," compelled the Council to clear away slums at enormous cost to the ratepayers. Moreover, the mere closing of old houses as provided for by the Act, was but too likely to intensify the evil, since there was nothing to prevent their owners from replacing old cottages by lofty buildings that were even worse from a health point of view, and

\* The italics are ours.



that, as a matter of fact, in several cases portions of new buildings had been closed under magistrate's orders as *unfit for human habitation*. On behalf of the ratepayers we pleaded for protection. Our opponents could not but recognise the strength of our position, but said that the argument did not apply to better-class houses, and consequently an attempt was made to meet them by defining in terms of measurement the houses that were to be especially dealt with. I insisted repeatedly upon the necessity of "applying the two-foot rule," but was at length compelled to yield, with the result that the vague words were substituted. The distinctive treatment was initiated years ago by "Torrens' Acts" and "Cross's Acts," now incorporated in the "Housing of the Working Classes Act, 1890." There is no doubt that the evils of overcrowding—i.e., of deficient light and air—are met with much more frequently, or to a more serious extent, in the houses thus vaguely alluded to, and it is some satisfaction to know that little or no difficulty has in practice arisen from the lack of a definition. Barristers seem to abhor definitions, and persuaded the Parliamentary Committees to strike out our definitions of "building" and "structure."

Whatever the objections may be to differential treatment, the Council is not to be blamed for it. The idea originated in the brains of such men as the late Lord Shaftesbury, the late Mr. Torrens, and Lord Cross before the creation of the London County Council, and was imported into the London Building Act by men outside the Council, whose object in "bidding for the working class vote" is not apparent.

A word as to the "centre of the roadway." The object in making the defined centre remain the legal centre is to make the owner on either side set back to a like extent, so that each shall in turn contribute an equal amount to the widening.

You do not seem to have noticed that an "inhabited" room includes a "living room" as well as a room in which some person passes the night.

Compensation is not granted to owners for greater width of road than 40 ft. in all cases.

Clause 49, regulating the height of buildings in reference to the height of streets is a re-actment. Of course, it is not logical, but it is a strong inducement to owners to lay out new streets 50 ft. in width. The height in this, as in all cases, is measured in the manner described in definition (21), and does not include the roof.

G. B. LONGSTAFF,

Chairman of the Building

Act Committee of the L.C.C.

\* \* We could not have remembered, certainly, that the separate definition of "height of a building" covered the case of the street less than 50 ft. wide. As to the "habitable room" we perfectly understand the Act, and Dr. Longstaff misses our point. A room is "inhabited" if it is slept in at night or if it is connected with a room which is supposed to be slept in at night; otherwise not. Our criticism was that rooms such as offices and chambers, in which people often pass many hours daily, but which are not connected with any sleeping-room and therefore not legally "inhabited," ought to have been classed also as "inhabited" rooms, and that it is a sanitary defect in the Act that they are not. I D.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XIV.

SOURCE OF WATER (continued).

**T**HE site of the embankment, or dam, having been thoroughly proved by means of trial-holes at least 5 ft. square, and of sufficient depth to admit of a proper examination of the strata, the next step is to determine whether it is to be constructed of earth or masonry. Where there is a good compact clay foundation, and the clay is abundant in quantity, the dam must, for economical reasons, be formed of that material. Where, however, the position and quantity of suitable rock make conditions favourable for the construction of a masonry or concrete dam, then undoubtedly such a dam would be better, although the comparative cost would be much greater. Having decided upon the material for construction, it must be disposed of in the design according to experience, the recognised laws of such structures, and the peculiar circumstances of the case.

Earthen embankments, as employed in the storage of water, consist, as a rule, of two trapezoidal-shaped figures formed of earth, clay, and stone, supporting a centre core of puddled clay, increasing in width directly as the depth (fig. 17, Paper XIII.). The proportions of earthwork dams are limited by the angle of repose or slope at which the material employed will stand. With cohesive materials this depends upon their power of absorbing water, which can best be found by experiment. Experiments upon several clays used in reservoir embankments show that the absorption by weight varies from 12 to 53 per cent. In the

latter case the embankment failed several times during construction. In practice the outer slope should not be less than the ratio of 14 horizontal to 1 vertical, and, as a rule, it is made either 2 or 2½ to 1. The inner slope, which has a greater tendency to slip, owing to its angle of stability being reduced by the water, should not be less than 2½ horizontal to 1 vertical, and is more frequently made 3 to 1.

The total width of the bank at the level of the top of the puddle-wall should not be less than three times the width of the puddle at that level. This width from slope to slope varies from 10 ft. to 30 ft.

The height of the embankment above high-water level varies according to circumstances. In numerous cases where the inner slope is continued up to the top of the embankment (fig. 20)

Fig 20



a greater height is required to prevent the waves from being driven over the top of the embankment in stormy weather. The late Mr. T. Stevenson, P.R.S.E., gives the following formula founded on his experience as a harbour engineer for finding the height of the waves in violent squalls:—

$$H = 1.5 \sqrt{D} + (2.5 - \sqrt{D}),$$

where H = the height of the waves in feet, where D = fetch in miles, which is the longest straight line that can be measured from any part of the dam to any part of the reservoir, when the latter is full and overflowing.

It is found to be more convenient to make the slope steeper above the water line with a storm wall at its summit (fig. 21), or to build a

Fig 21



storm wall entirely across the embankment at the high-water level with a coping projecting at least 6 in. (fig. 22). This has the effect of curving

Fig 22

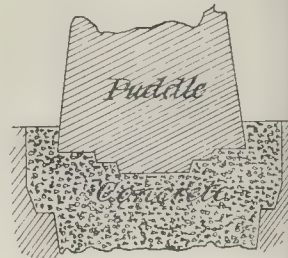


the waves back, and affords every protection to the top of the bank. The height of the top of the bank above the water in flat slopes should not be less than 8 ft. vertical, and with steeper slopes 5 ft. vertical, with a dwarf wall at the water-line not less than 4 ft. vertical.

The width and batter or taper of the puddle-wall varies with the materials of which it is composed. The clay used for the puddle should be carefully selected, and be of good tenacious quality, comparatively free from loam, friable stones and vegetable matter. A small proportion of gravel is an advantage, and increases its stability. The clay should be turned over and weathered for two or three months, and then well cut, tempered and worked in stages, and afterwards passed through pug-mills. It is then conveyed to the trench and inserted in layers. The top width of the puddle-wall varies from 3 ft. to 10 ft., and tapers outwards at from 1 in 8 to 1 in 16 down to the surface level, where it is either keyed into a concrete shoe as a base (fig. 23) or is continued down in a trench until a sound foundation and retentive material are reached. The trench puddle is frequently carried down at a reverse or inward batter at rates of 1 in 8 to 1 in 16, according to circumstances (fig. 24). When the pervious strata extend to a considerable depth it may be necessary to carry the trench down vertically the full surface width of the puddle-wall. Where this is done the bottom of the trench is covered with a layer of cement concrete connected to a key-piece of the same material, the layer at the base being 12 in. or more in thickness. Where the

strata are very porous with spring rising, a wall of concrete should be extended up the inner face of the trench as a protection to the puddle. Water must in no case be in direct contact with the puddle.

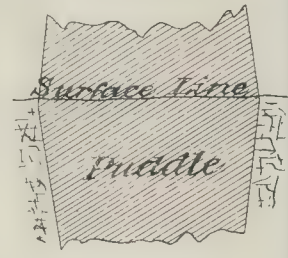
Fig 23



Springs should be carefully dealt with when found within the area of the embankment, and should be conveyed by means of concrete channels of sufficient capacity to the outside of the embankment.

The whole of the soil and earthy materials as well as stumps and vegetation should be cleared off the site of the embankment, and no vegetable earth should be used in

Fig 24



its construction. The materials used in the inner portion should consist of fine clayey or other adhesive earth with a small proportion of stones or ballast, the outer portion consisting mainly of dry, hard, and stony materials. On either side of the puddle-wall a width of selected clayey material is formed for the purpose of keeping the puddle moist, and to assist in its protection. The whole of the material should be deposited in layers of from 9 in. to 2 ft. in thickness, curving or dipping towards the puddle-wall on either side. In some cases a bed of puddle is carried from the wall under the base of the inner slope and continued up the slope, sufficiently protected with selected material. The object of this is to render the inner bank impermeable (fig. 25).

In excavating within the reservoir area for the purpose of providing material for the construction of the embankment, or with a view to increasing the capacity of the reservoir, care must be taken not to remove an impervious covering over pervious strata, and thus create a difficulty which it should be the main object to avoid.

The inner slope should be protected with stone pitching over the entire area of the made embankment after it has become consolidated, the toe of this pitching being embedded in a concrete footing. The solid slopes, when of a clayey nature, are also usually pitched with stone for a vertical height of 3 ft. above and at least 5 ft. below the high-water line, as a protection from the wash of the waves, and as a preventive against the growth of vegetation in the shallow water, as well as against discoloration from the dissolved clayey matter.

In cases where a reservoir is constructed practically on a tableland and embanked all round, sufficient material is excavated from the interior to form the embankments and provide the requisite capacity. The methods of providing are in every way similar to the foregoing.

There are two indispensable accessories to an impounding reservoir, viz., the outlet and over-



Fig 25

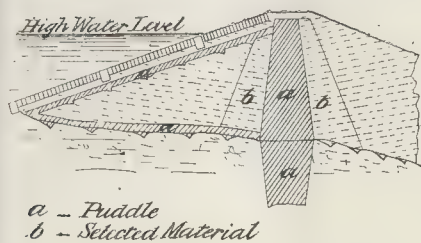


Fig 26

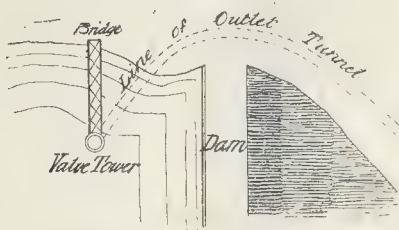


Fig 27

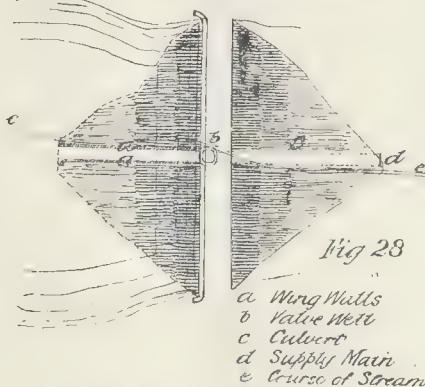
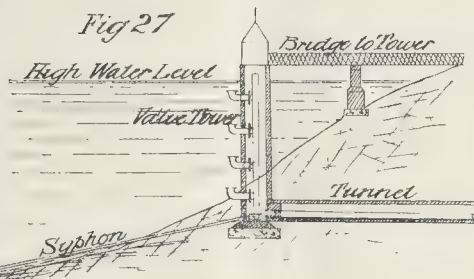
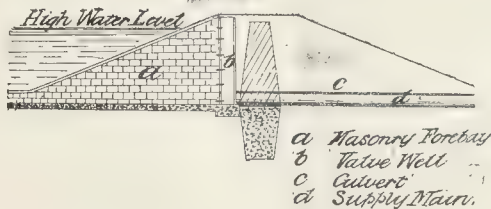


Fig 29



low weir, over which many difficulties have arisen and through which many disasters have occurred. The outlet arrangements are carried out in several ways, according to the special circumstances of each case. The method of carrying the outlet pipes through the deep portion of the embankment has been rarely followed, and is only permissible in shallow reservoirs. The terrible disaster in 1864 at the Bradfield Dale Dyke Reservoir, near Sheffield, when 250 lives were lost, resulted from this practice. In reservoirs not exceeding 25 ft. in depth a syphon (the action of which has already been explained) is the most economical and efficient as well as the safest method of drawing the water off. It does not interfere in any way with the embankment below the high-water line, and the same method has been recommended by Mr. Robert Kewlinson for drawing off the lower water from large reservoirs (fig. 26). This obviates the necessity of carrying the tunnel outlet at so low a level. The advantages of doing so are less interference with the strata at great depths and economy in construction. The system generally adopted in large reservoirs is to cut a trench to drive a heading through the solid rock to one end of the embankment, and construct a stone, brick, or concrete and iron culvert with a valve tower in the reservoir (fig. 27). The base of the tower is below the deepest portion of the reservoir, unless a syphon is adopted and arranged to draw off the water at different levels. The water is discharged through the supply main laid within the culvert. The advantage of this system is the facility with which any of the working parts can be examined and repaired without interfering with the embankment or being in any way a source of weakness to it. The question whether it is preferable to drive a heading or cut an open trench for the culvert depends upon the nature of the rock, apart from economical reasons. Where the rock is solid and compact a heading is preferable in most cases, but where the rock is fissured and contains any "backs," an open trench which is filled in by the culvert progresses is frequently the better course. This is due to the considerable difficulty attendant upon consolidating around the culvert a timbered heading in fissured ground. In cases where it is necessary to cross the puddle-ench at a higher level than the bottom of the trench, the culvert should be supported on a concrete pier brought up from the solid rock. The method represented by figs. 28 and 29, is not a system to be recommended. Here the outlet is placed in the deepest part of the embankment, and consists of a masonry forebay, supported by concrete struts, and a draw-off well and tunnel, also

in masonry. The tunnel is supported on a concrete pier (with or without slip joints), where it crosses the puddle-trench. This system is objectionable from the fact that many of these tunnels have been distorted or cracked, frequently developing leaks. Such structures in all probability constitute an element of weakness where the greatest strength is required.

#### THE LONDON COUNTY COUNCIL.

THE usual weekly meetings of the London County Council, were resumed on Tuesday last, after the summer recess, in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

**Central Laundry, Boundary-street Scheme.**—The Public Health and Housing Committee reported that they had had under consideration the provision that should be made for washing and drying the tenants' clothes on the Boundary-street area. The practice hitherto adopted in the Council's buildings as well as in the various dwellings erected by the Artisans' Dwellings Companies has been to provide washhouses either on each floor of the tenements or on the roof, and any arrangements by which tenants were enabled to do the washing at home has doubtless its advantages. From inquiries they had made the committee gathered that tenants experienced considerable difficulty in drying their clothes satisfactorily on the roofs of the dwellings, in consequence of the fact that the clothes when washed were soiled by the impurities with which the air was charged. It was also apparent that considerable inconvenience and physical injury attended the practice of clothes drying in the tenants' rooms. Having regard to these circumstances, the Committee were of opinion that, in lieu of any provision for washing and drying in

the tenements, a common laundry placed in a central spot on the area as possible was preferable. From the evidence that had been put before them on the subject it appeared that laundries where mechanical means of washing and drying were provided were generally very successful as regarded their practical result. The architect had submitted a plan of the proposed building, which provided for a waiting room, a laundry proper with forty-two washing stalls, each stall having a washing compartment with hot and cold water supplied and a boiling compartment fed by steam. At the end of each range a hydro-extractor would be provided for wringing, and a mangle driven by steam, and at the end of the building there would be a range of 42 drying-horses for drying with hot air. The clothes after drying would be taken to the ironing room. Four baths for women were provided, approached from the laundry, and twelve baths for men in an annex to the laundry building. The site proposed lay to the west of Turville-street on the south side of Charlotte-buildings, and was well within five minutes' walk of the farthest dwellings on the area. The committee had carefully considered the question of the cost of the central laundry as against the cost of laundries in the dwellings, and they had prepared a statement of capital expenditure, together with the estimated outgoings and receipts based on the assumption that the bulk of the tenants would, as it is obvious they must, make full use of the accommodation provided. From this statement it appeared that an annual deficit of 392l. 18s. 3d. was anticipated, which represented an additional rent of 3d. per week per room. As a set-off against this extra charge, it was estimated that by abandoning the laundries in the dwellings a capital outlay of 13,125l. would be saved, equivalent to a saving of an annual



expenditure of 700l. 13s. 9d., or 13d. per week per room. The total gain therefore to the tenants was 3d. per room. There was of course the additional charge for the use of the laundry which could not be equal to the cost of providing separate fires for washing and drying purposes. The committee considered this charge on other accounts to be more than compensated for by the many advantages afforded under the arrangement, and they accordingly recommended:—

That, subject to an estimate being submitted to the Finance Committee in accordance with the plan of a central laundry on the Boundary-street area be approved, and that the Architect and Engineer be instructed to prepare the necessary drawings.

Mr. Lloyd moved an amendment to the effect that the matter be referred back for further inquiry, and this was seconded by Mr. Fletcher.

Mr. Holmes was of opinion that the wash-houses would not be used by the householders, but by professional washerwomen.

Lieut.-Colonel Ford considered that the scheme would prove a failure, financially and otherwise.

Alderman Spicer regarded it as an experiment worthy of trial.

**Buildings of a Cubical Capacity exceeding 216,000 feet.**—The Building Act Committee recommended

"That the application of Mr. A. Hessel Tiltman, on behalf of the Electric Lighting Committee of the Vestry of St. Mary, Islington, for the consent of the Council to the erection of an electric lighting station at the rear of houses on the west side of Barnhill Lane, Islington, Holloway, with divisions each exceeding 216,000 feet cube, as shown up to the plans accompanying the application, be not granted, as it is well across the roadway at the rear of the houses on the ground plan, and is proposed to carry up through the roof, and has an opening in the centre in excess of the width allowed by rule 3, sect. 28 of the Metropolitan Building Act, 1855, such wall not being therefore a party-wall under that Act, the engine-house and gateway, &c., adjoining, taken together, would contain 473,793 cub. feet, and the General Powers Act, 1850, does not give the Council authority to permit the erection of a building, or division of a building, for the purposes of trade or manufacture which would exceed 450,000 feet cube; it is also deemed undesirable to permit the enclosure of the ends of the engine and boiler houses with iron as proposed, as in the opinion of the Superintendent Architect and the Chief Officer of the Fire Brigade the risk of fire extending to the ad. joining premises would be increased."

The recommendation was agreed to, but the Council subsequently approved of an amended application for the erection of an electric lighting station with divisions each of a cubical capacity exceeding 216,000 ft., but not exceeding 450,000 ft.

**Purchase of Tramways.**—The Highways' Committee reported that the Council was now in a position to give notice to the London Tramways Company under the 43rd Section of the Tramways Act, 1870, requiring the company to sell to the Council about two miles of tramway in Kennington-park-road, Newington-butts, Newington-causeway, Stone's-end, Blackman-street, New Kent-road, St. George's-road, and London-road. The Council had in two previous cases affirmed the principle of the acquisition of tramways under the powers conferred by the general Tramways Act of 1870; and as the Committee were of opinion that the purchase of the tramways above mentioned could be effected without loss to the ratepayers, and that the transfer of ownership to the Council would be a public benefit, they recommended accordingly. The recommendation was adopted.

**Southern Approach to the Tower Bridge.**—Dr. G. J. Cooper moved—"That it be referred to the Improvements' Committee to consider and report to the Council at the earliest possible moment, before again bringing up a scheme for a southern approach to the Tower Bridge, whether the lines of route taken by the vehicular traffic passing over the bridge do not demonstrate that the public advantage will be much better served by abandoning the approach hitherto advocated by the Council, and making one approach directly communicating with the centre of the Borough, and another to intersect the Old Kent-road, near to the Trafalgar and Albany-roads."

Mr. Costelloe seconded the motion, but after some discussion, the consideration of the subject was postponed.

After transacting other business the Council adjourned about half-past six o'clock.

#### OBITUARY.

We have to record the death of the Italian archaeologist Gian Battista de Rossi. He was born at Rome in 1822, and educated in that city. He first occupied himself with Christian Inscriptions of the first century and was thereby led on to a thorough investigation of the catacombs, his book on this subject, *Roma sotterranea Cristiana*, bringing him a wide celebrity. He filled a professorship at the University of Rome,

and was a member of the "Pontificia Accademia d'Archæologia" as well as of numerous foreign societies.

#### GENERAL BUILDING NEWS.

**BAPTIST CHAPEL, PEEBLES.**—A new Baptist chapel was opened at Peebles on Saturday last, which has cost about 400l.; it was designed by Mr. Robert Murray, architect, Edinburgh.

**EPISCOPAL CHURCH, MOTHERWELL, NEAR GLASGOW.**—On Saturday last the foundation-stone of a new Episcopal church in course of erection at Motherwell was laid. The church is situated at the junction of Avon- and Crawford-streets, and is to take the place of the present iron structure.

**RESTORATION OF PARISH CHURCH, REDDITCH.**—After a thorough restoration this church was reopened on the 26th ult. by the Bishop of Worcester. The interior especially has been considerably renovated. The old rafters which supported the roof have given place to an arched ceiling, panelled, and decorated with ornamental bosses. The body of the church has been laid with Mansfield stone, and the remainder of the flooring consists of red wood blocks. The chancel has undergone very great alteration. The intervening arches have been brought forward in order to allow additional accommodation for the choir. The old rafters above have here, as in other parts of the building, been removed, and replaced by a groined roof at a higher elevation, so as to permit the adding of clerestory. Between the stalls the floor has been laid with black and white marble squares. The cost of the work was 5,000l., the architect being Mr. Temple Moore, of Westminster, and the contractors Messrs. Brazier & Son, of Birmingham.

**WESLEYAN CHURCH, SEAFORD, SUSSEX.**—The recently-erected Wesleyan church at Seaford, was opened on the 26th ult. The building is of red brick, with plain Gothic windows, and has a varnished open roof. It has cost 860l., including additional land for future extension. The architect is Mr. C. Bell, of Salter's Hall-court, E.C.

**BUSINESS PREMISES, FENRITH.**—An extensive pile of buildings, for Messrs. Hetherington Brothers, has just been completed in the Corn Market, Fenrith, and fitted throughout with the electric light. The front to the market is of red stone, with suitable decorative details. Over the entrance appears an elaborately-carved head in Aberdeen granite, representing Jupiter Olympus. The ground-floor is occupied by a large shop, over which are show-rooms, and a number of store and work-rooms, with other accommodation above. Factory, stores, and stabling premises have also been erected, and the yard adjoining. The architect is Mr. H. Higginson, of Carlisle.

**NEW BANKING PREMISES, COVENTRY.**—The old banking premises belonging to the London and Midland Bank (and formerly the Coventry Union Banking Company), situated at the corner of High-street and Little Park-street, Coventry, have been pulled down, and new premises are now in the course of erection by Mr. Charles Haywood, jun., Coventry, from the designs of Mr. Frank Barlow Osborn, architect, Birmingham. The new buildings, which will be in the Elizabethan style of architecture, will comprise, in addition to the banking premises, a suite of offices, the new ground floor in Little Park-street, and a bank manager's residence on the first and upper floors. The banking-room, which will be 40 ft. long and 34 ft. wide, is arranged to accommodate twenty-six clerks. The internal fittings will be in polished walnut. The strong-rooms are situated in the basement, a hydraulic lift being provided, communicating with the banking-room above. The remaining portion of the basement will be appropriated to the use of store-rooms, lavatory, heating-chamber, &c., the whole being rendered fireproof. The building will be carried out in white Hollington stone and red bricks, and roofed with tiles; it is expected to be completed by August next.

**WESLEYAN CHAPEL, CORBY HILL, CUMBERLAND.**—The foundation-stones of a Wesleyan Methodist Chapel at Corby Hill were laid on the 27th ult. The edifice will be of brick, and is estimated to cost 300l.

**FREE CHURCH, GRETNNA.**—The new Free Church which is being erected at Gretna, from designs by Mr. T. Taylor Scott, architect, of Carlisle, will cost about 700l. The building will be oblong in shape, and of Gothic or simple Early English type. Externally the walls will be of red Corsehill stone, and the structure will be lighted with four two-light windows on each side and wheel windows at the gable ends, whilst the porch will have two single-light windows, one at each side. The floor will be tiled with red and black paviors.

**THE GAMBLE INSTITUTE, ST. HELEN'S, LANCASHIRE.**—On Tuesday last the foundation-stone of the extensive pile of buildings to be known as the Gamble Institute, St. Helen's, was laid. The *Daily Graphic* states that the building, which is to be used for purposes connected with a Free Library and Technical Schools, will occupy one of the most commanding sites in the borough, and will present a handsome frontage to Corporation, Hardsbaw, and Bicker-staff-streets. It will be faced with pressed bricks and red terra-cotta on a granite sub-basement, and will be in the Victorian style. The free library will

occupy the whole of the ground floor, and will be raised about 7 ft. from the street level. The entrance will communicate with a spacious hall, behind which will be the lending department, capable of accommodating 40,000 volumes. The frontage to Bicker-staff-street will be occupied by the news-room, whilst the reference library and other rooms will occupy the opposite wing. A private room for the librarian is placed between the reference and the lending departments. In the technical school the director's office and waiting-room are arranged on the ground-floor level, communicating directly with the school staircase, and the hall of the free library. On the first floor will be provided the physics laboratory, dark-room, and store-room; the physics room, with the seating on the amphitheatre plan, to accommodate ninety students; preparation room, and two large class-rooms. The wing to Corporation-street on this floor will embrace student common room, two large class-rooms, and the geometrical-drawing room. On this floor will also be placed the cookery and laundry departments, which are so designed that the whole area can be used as one room for demonstrations. The second floor will be devoted to the chemical and art departments, the chemical laboratory for sixty students, the balance and consultation room, the lecture theatre and preparation room occupy the whole wing to Bickerstaff-street. The modelling, painting, and art masters' room and office are placed in the north-light wing. Messrs. Briggs & Wolstenholme, of Blackburn and Liverpool, are the architects.

**TEMPERANCE HALL, SWANSEA.**—On Monday last the Temperance Hall, recently erected at the corner of Gower- and Orchard-streets, Swansea, was opened. It is a large building, and comprises four shops, a coffee tavern, two suites of offices, a large and handsome hall to accommodate 1,400 persons, a room for smaller meetings, &c. It has cost nearly 10,000l. The hall has at one end a large platform, erected for the purpose of other entertainments, which is decorated with moulded panels. Messrs. Hannaford & Wills, of Union-street, Swansea, are the architects.

#### SANITARY AND ENGINEERING NEWS.

**NEW BRIDGE, KINGUSSIE, N.B.**—The foundation-stone of the new bridge in course of construction over the river Spey, at Kingussie, was laid on Friday, the 28th ult. The piers are completed and the erection of the super-structure will be proceeded with at once. The bridge was designed by the Badenoch District Surveyor, Mr. Macdonald, C.E.; and the contractors are Messrs. Sommerville, Dalmeir & Iron Works, Glasgow; and the sub-contractors Messrs. Paton, Glasgow, and Mr. James Macdonald, builder, Kingussie.

**PROGRESS OF ELECTRIC LIGHTING IN LEECHES.**—Additional plant is now being laid down in the Yorkshire House-to-House Electricity Company's Station, Whithall-road, Leeds, to meet the increased demand for the electric light in that city, and the engine-house, &c., has been considerably extended. The new plant comprises three additional Lancashire boilers, each 30 ft. by 8 ft., and capable of working up to 140 lbs. pressure; three horizontal condensing engines, each of 400 i.h.p., and three 200-kilowatt alternating current dynamos. The capacity of the station, now in operation, the capacity is thus being raised to 1,800 i.h.p. This is a large producing power. It is stated that, excepting Liverpool, no town or city in the English provinces is known to possess a central electric lighting station equipped with such powerful engines. It is anticipated that the Town Hall and municipal buildings will shortly be lighted from this source.

**MANCHESTER SHIP CANAL. OPENING OF WALTON LOCK.**—The Walton lock, which gives access to the Ship Canal from the river Mersey at Warrington, was formally opened on Monday last, October 1. The new lock is 229 ft. in length and 30 ft. wide, and will contain 10 ft. 6 in. of water at low water. On the south side there is a 20 ft. sluice for flushing purposes. It has been in process of construction since last November.

**OPENING OF THE UPPINGHAM AND SEATON RAILWAY.**—The new railway from Uppingham to Seaton, on the London and North-Western Railway, was opened on Monday last for passenger traffic. The work was commenced in November, 1892; and the *Leeds Mercury* states that during its construction seven landlips occurred, one or two of them very serious, which have cost nearly half the total sum expended on the line. On leaving Seaton station the new railroad goes in the direction of Stamford for about three-quarters of a mile before the Uppingham junction is reached, and then branches off to the left. There is a rise of 16 ft. from Seaton seven miles to the junction, but from that point the line falls down a gradient of one in sixty-six, in order to pass under the viaduct of the Midland Railway from Manton to Kettering. This is the lowest point on the line, the station at Uppingham being 212 ft. above it. The altitude of the town has caused great difficulty in the making of railway communication, and in one case a long viaduct has been built. The length of the new line is between three and four miles. The total cost of construction was 30,000l., apart from the purchase of the land. The contractors were Messrs. W. Radcliffe & Co., of Huddersfield; the ironwork contractors, Messrs.



large number of visitors. The health of the proprietors was proposed by the chairman, and acknowledged by Mr. F. Gordon, the other toasts being "The architect and builders," proposed by Mr. V. Negus, and responded to by the chairman, and that of "The visitors," proposed by the Rev. Benjamin Wagh, and replied to by Mr. W. H. Collingridge.

CASEMENT STAY-BARS AND FASTENERS.

Messrs. Baker & Sons, of Birmingham, send us an illustration sheet and specimens of their patent casement stay and fastener combined, for casement windows. By means of hinged joints the stay becomes also the handle to turn the fastener, being straightened for that purpose, and hanging vertically by the sash-frame when the window is closed. Another advantage claimed is that as the stay holds the middle of the window and not the bottom rail, the sash has no objectionable tendency to warp under a blast of wind. The convenience of having fastener and stay in one is obvious, the only drawback being that the stay is rather conspicuous when the window is closed.



## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

## COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
St. Paul's Port House, Port of London, &c.	St. Paul's Port House, Port of London, &c.	300 & 200.	Oct. 18
St. Paul's Port House, Port of London, &c.	St. Paul's Port House, Port of London, &c.	First 1000, and 4000.	Nov. 27
St. Paul's Port House, Port of London, &c.	St. Paul's Port House, Port of London, &c.	Between the next four	Mar. 1, 95

## CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Supply of Materials.	Borough of Croydon.	Official.	Oct. 9
Reel Works.	Reel Works, Ltd.	J. Lovell.	Oct. 10
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 11
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 12
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 13
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 14
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 15
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 16
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 17
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 18
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 19
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 20
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 21
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 22
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 23
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 24
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 25
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 26
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 27
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 28
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 29
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 30

## CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Oct. 31
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 1
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 2
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 3
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 4
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 5
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 6
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 7
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 8
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 9
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 10
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 11
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 12
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 13
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 14
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 15
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 16
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 17
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 18
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 19
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 20
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 21
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 22
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 23
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 24
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 25
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 26
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 27
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 28
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 29
Reel Works.	Reel Works, Ltd.	T. H. & W. R. Richard.	Nov. 30

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
Clerk of Works.	Cardiff Union Gdn.	22. 10s. per week.	Oct. 9
General Foreman.	Cardiff Union Gdn.	22. 10s. per week.	Oct. 12
Assistant Borough Surveyor.	Cardiff Union Gdn.	22. 10s. per week.	Oct. 15
Surveyor.	Cardiff Union Gdn.	22. 10s. per week.	Oct. 18

Those marked with an asterisk (\*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv., vi., and vii. Public Appointments, pp. xx. and xxii.

**SANITARY INSPECTORS' ASSOCIATION.**—This association has arranged a course of lectures to be given at St. James' Hall, Piccadilly, by well-known professors and lecturers, commencing early in this month, in which a prominent feature will be made of that difficult question, the prevention of nuisance from smoke, which is one of the new duties the amended law has given the Metropolitan Sanitary Officers. Modern drainage in all its important details, bacteriology, and physiology are also to be dealt with.

**THE FORTH-COMING IRON AND STEEL CONFER- ENCE IN GLASGOW.**—A meeting of representatives of the Scottish iron and steel industries was held on Monday last in the Glasgow offices of Mr. William Jacks, M.P., and under the presidency of that gentleman, for the purpose of considering arrangements to be made on the occasion of a conference of the iron and steel trades of the West of Scotland to be held on the 30th inst. in Glasgow. It was arranged that the programme should include reports on foreign competition and the eight-hours' movement as affecting the iron and steel industries, and on the requirements of light railways for agricultural districts. On the same occasion Mr. William Jacks will deliver a presidential address, in which he will review the circumstances of the trade generally, and papers will be read on new sources of consumption for iron and steel, and the conditions that influence demand and supply in Eastern markets. Mr. Law, of Messrs. Jacks & Co., will read a paper on the recent course of the pig-iron industry of Scotland and the changes it has undergone. It is also expected that a paper will be presented on the effect of the Railway and Canal Traffic Act of 1888 on the iron trade, with special reference to the conditions of that industry in Scotland.—*Scotsman*.

**UNIVERSITY COLLEGE LECTURES.**—"Discoveries in Architecture" is the title of the Free Public Opening Lecture with which Professor Roger Smith resumed his classes at University College, London. This lecture will be delivered on the evening of Thursday, the 12th inst., and among the illustrations will be photographs, shown by the lantern, of some of the remarkable Greek sarcophagi, covered with rich sculpture and ornament which were found at Sidon, but are now transferred to the Museum at Constantinople. The Metropolitan Building Act, 1861, will form the principal subject of Professor Roger Smith's lectures to his class for Modern Practice during the session about to commence.

**PLUMBERS' COMPANY EXAMINATIONS.**—At the meeting of the quarterly court of the Plumbers' Company, held on Saturday last at the Guildhall, a return was presented of the examinations held by the

Company under their graded syllabus of practical and theoretical instruction for plumbers, showing that the examinations for the current year had been held at twenty-four centres in the United Kingdom, and that the passes in the preliminary grade of the examinations was 30 per cent. as compared with 49 per cent. in the previous year, and the passes in the intermediate examination were 30 per cent. as compared with 63 per cent. in 1893. A report from Norwich was received announcing the formation of a district council for the counties of Norfolk and Suffolk to deal with registration of plumbers in that district.

**KING'S COLLEGE.**—A lecture, illustrated by the oxy-hydrogen lantern, entitled "An Architect's Ramble amongst London Buildings," was delivered at King's College on Wednesday evening, by Professor Banister Fletcher, F.R.I.B.A. In introducing his subject the Professor said that many people took their tramps abroad unconscious of the beauties lying at their very doors. He wished, therefore, to show that London, even within the strict sphere of bricks and mortar, had ever fresh charm, and to endeavour to persuade his hearers that, if some fate were to decree that a man should be compelled to live in any one city, this City of London should be the place of his choice. He wished his audience to wake up to those architectural beauties which lay within their grasp, and to show that there was in London a wealth of architectural variety which every Londoner should at least make it his duty to become acquainted with. He assured them that they would find a sufficient repayment in the intellectual enjoyment and educational benefit which they would obtain for their research. Among the several kinds of antiquities, none were so much regarded as those of buildings, whether for magnificence, curious workmanship, or for the persons who had inhabited them. A district of one mile round St. Paul's would contain almost in its whole of the ramble. Taking the Tower as the starting-point, the Professor took his audience past the Guildhall, the Mansion House, St. Paul's, to Piccadilly and Westminster, taking in also some buildings which were somewhat out of the line of route. The plan of the Tower of London showed what was the general disposition of a Norman castle, and the keep, or White Tower, which stands to-day in practically the same state as Gundulf left it in 1078. The celebrated Chapel of St. John was justly famous as a most perfect little specimen of Norman architecture. The exterior of the Guildhall bore no architectural importance, but the roof inside was an example of hammer-beam construction worth inspection. There was nothing striking about the design of the Mansion House, except as a phase

of the later English Renaissance. The architectural detail of the Bank of England was beautifully executed, and some of the planning and distribution of the internal courts was like an architectural oasis in the desert to the weary architect or lover of art who passed through them during the day. The most noticeable feature in Chesham was the fine steeples of St. Mary-le-Bow with which no modern steeples could compare, either for beauty and richness of outline, or for the appropriateness and variety of classical details were applied to so novel a purpose. The General Post Office presented nothing of importance except in its firmness of parts and simplicity of treatment. St. Paul's, the *magnum opus* of Sir Christopher Wren, abounded in beauty of detail which in the lecturer's opinion was a perfect fountain of Renaissance detail. Passing Newgate down Ludgate Hill by the Temple and the New Law Courts, they reached Somerset House whose predominant and rare characteristic was a grandeur of line possessed by few modern buildings. The grand staircase of the British Museum was, perhaps of its kind the finest in Europe, but it was to the exhibition of sculpture that students would be particularly drawn. After touching the Albert Hall, Piccadilly Circus, and the buildings in Trafalgar square, the Houses of Parliament and Westminster Abbey were reached. Many views of these structures both internal and external, were exhibited, the Professor explaining them somewhat in detail. Prior to the lecture the prizes were distributed by Mr. Niewann Smith, Master of the Worshipful Company of Carpenters, to the students of the Architecture and Building Construction Classes, and the Wood-carving Classes, at King's College, Great Titchfield-street, and Kensington. The principal winners were: Architecture and Building Construction, third year, H. Albery, gold medal and 3d.; J. Davidson, bronze medal and 3d.; F. W. Rowe, silver medal and 3d.; and H. L. Triggs, bronze medal. In Wood-carving, E. R. Hind and L. Clarkson, bronze medal and one year's scholarship; A. South, bronze medal and one year's scholarship; J. A. Vogt, first prize certificate and 5d.; and W. Bowler, extra prize, 3d.; Arthur May, first prize certificate and 5d.; A. S. Randle, first prize, 5d.; James Osmond, second prize, 2d.; Wm. Assonier, first, extra prize, 2d.; Chas. Redmond, first prize, 2d.; and F. N. (drawing), first prize, 3d.

## CAPITAL AND LABOUR.

**MASONS' DISPUTE, BRISTOL.**—A sub-committee of the Bristol Master Builders' Association, and the local operatives re the masons' dispute at Tyde











# The Builder.

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OCTOBER 13, 1894.

## ILLUSTRATIONS.

Crypt, St. John's Clerkenwell.—From a Drawing by Mr. W. Monk .....	Double-Page Ink-Photo.
New Japanese Houses of Parliament, Tokio: Perspective View, Longitudinal Section, and Plan of Principal Floor.—Messrs. Ende & Boeckmann, of Berlin, Architects .....	Double-Page Ink-Photo.
Endalls Manor, Wargrave-on-Thames.—Mr. John Belcher, Architect .....	Double-Page Photo-Litho.
Hurstbourne, Hants: Interior View of Great Hall and Staircase.—Messrs. Beeston & Burmester, Architects .....	Two Single-Page Photo-Litho's.

## Blocks in Text.

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### The London Building Act.—III.



ONE new provision we omitted to mention in our last, in regard to furnaces and ovens—viz., that the floor over any room or enclosed space in which a furnace is fixed, and any floor within 18 in. of the crown of an oven, must be constructed of fire-resisting materials.

The provisions as to construction of stairs, passages, &c., in public buildings and in buildings more than 125,000 ft. in cubical extent, and used for separate families, are now combined in the same section (68),\* with the verbal difference that the word "fire-resisting" is substituted for "fire-proof."

Section 69 makes a new provision to the effect that in every building constructed or adapted to be occupied in separate tenements by more than two families the staircase used in common shall be ventilated upon every story above the ground story by windows or skylights opening direct into the outer air, or "shall be otherwise adequately ventilated," and that the principal staircase of a dwelling-house not included under the above definition shall be ventilated by a window or skylight to the external air.

The minimum of height "for habitable rooms" is raised from the present very inadequate 7 ft. to 8 ft. 6 in., except in the case of habitable rooms wholly or partly in the roof, which must be 8 ft. in height throughout not less than one-half their area.

Sub-clause *c* of the same section (70) applies to all habitable rooms the provision at present only specially applicable (by the Public Health Act, 1891) to underground rooms, that the window area clear of sash-frames and "free from any obstruction to the light" (the last words are new) must be equal to one-tenth the floor area of the room. One-half the window or one-twentieth of the floor area (as at present) must be made to open, and the opening must extend to at least 7 ft. above the floor level. The area of window space demanded will

deprive some very aesthetic architects of the little windows in which they delight, but on the other hand the space for opening and the height to which the opening need extend are somewhat insufficient. In a sanitary sense it is certainly bad for a room to have any considerable part of its space above the possibility of an open window. The window, it should be added, may open either into a conservatory or into the open air. For a room having no external wall or constructed wholly or partially in the roof the area of window may be one-twelfth the floor area, one-twenty-fourth to open, the opening to extend to 5 ft. above the floor level; or it may be lighted by a lantern-light of which a portion equal to one-twentieth of the floor area can be opened. The whole area of the "lantern light," for some reason, is not specified.

In a building which is a dwelling-house\* any basement with a wooden floor shall have (Section 70 *d*) a sufficient space under to admit of ventilation (this is provided by the Public Health Act as to "underground rooms") unless it is a floor "constructed of solid wood bedded on concrete."

A habitable room over a stable (Clause *e* of the same section) must be separated from the stable by a floor with a layer of concrete pugging of good quality, or of other solid construction 3 in. in thickness between the joists or girders, finished smooth on the upper surface and properly supported; the underside ceiled with lath and plaster. We doubt if this goes as far as is desirable. "A floor of brick or concrete or other solid material carried by iron girders" would have been better. A staircase or gallery by which any such room is approached must be separated from the stable, where adjoining it, by a brick wall not less than 9 in. thickness. Why necessarily a brick wall? Suppose it is a stable built of stone or concrete, must a brick wall be inserted in this particular case? The District Surveyor would probably say he had no power to allow anything else.

A special clause (*f*) provides that nothing in Section 70 affects or repeals any of the provisions of the Public Health Act, 1891, as to underground rooms, and a sub-section (2) provides that anyone who suffers a room to

be inhabited which is not in conformity with the provisions of this section is liable to a penalty for every day the room remains so inhabited (amount of penalty not stated).

Section 71 repeats the existing law as to party arches or floors over public ways, &c., and Section 72 that as to arches under passages or public ways (24 and 25 of the 1855 Act), without alteration except as to a non-essential rearrangement of wording.

Section 73 brings us to the important subject of "projections." Sub-section 1 repeats in the main the provisions of the first sub-section of Section 26 of the 1855 Act, but with the following modifications: to the list of projections which are to be of fire-proof material are added "outside-landing outside-stairs and outside-steps"; to the phrase "eaves and cornices" is added "barge-boards"; in the sentence excepting the cornices, &c., of detached and semi-detached dwelling-houses the words "distant at least 15 ft. from any other building and from the ground of any adjoining owner" are struck out, and a sentence is added excepting also "dwelling-houses in which the party-walls are corbelled out so as to project 4 in. beyond such eaves, barge-boards, or cornices." It is added that "for the purpose of this subsection a pair of semi-detached houses shall be deemed to be one building." It does seem extraordinary that the framers of the Bill, having got thus far in considering a semi-detached house as one house, should nevertheless have stopped here, and refused to consider them as one building in regard to the projection of the party-wall above the roof.

Sub-section 2 provides that every balcony, cornice, or other projection must be tailed into the wall, and weighted or tied down to the satisfaction of the District Surveyor, and that no cornice shall exceed 2-6 projection over the public way. To this latter provision we have already referred. It may be a very wholesome rule for the narrow streets proposed by the Act, but as a restriction for a monumental building abutting upon a wide street it would be absurd. Sub-section 3 repeats the existing provision as to the extent of projection of shop-fronts and cornices beyond the external wall of the building, to be allowed in the two cases of streets or ways of less and of more than 30 ft. wide: but to it, after the present closing words "to any extent not exceeding 18 in. beyond the external wall of the building to

\* We used the word "clause" in previous articles for the principal numbered divisions of the Act, but as the word "section" is used in all references in the Act it is better to adopt that. "Section" in this article therefore means the same as "clause" in the two preceding articles.

\* A dwelling-house is described among "Definitions" as "a building used or constructed or adapted to be used wholly or principally for human habitation."

which it belongs," are added the words "over the ground of the owner of the building" provided that this provision shall not authorise in any such street the projection of any part of any such shop-front other than the cornice on or over the public way or any land to be given up to the public way." This clause was a somewhat confused one before, but it is now confusion worse confounded. We are told almost in the same breath that a shop cornice may project 18 in. "over the ground of the owner," and that this provision does not authorise the projection of any part of the shop-front other than the cornice over the public way. Then what is the meaning of "over the ground of the owner?" Is the cornice regarded as projecting over the owner's land or over public land? Or do the words, "over the ground of the owner," mean that the cornice is not to extend further than the width of the premises—not to mitre beyond them? If that is the meaning, could anything be worse expressed? And when we are told that nothing but the cornice shall project over the public way, then over *what* is the other projection of the shop-front, of 5 in. or 10 in. beyond the external wall? Is not that over the public way? or is the external wall supposed by a fiction to be set back 5 in. or 10 in. (as the case may be) to allow for these projections? Which is the real line of the public way, the "external wall" or the projections? The whole sentence is a complete muddle of contradictory expressions; we may presume that District Surveyors know what it means, but if they do it must be by some inner light, for the clause certainly does not explain itself. The worst of it is that all this rigmarole is only for the purpose of aiding and abetting the architecturally absurd notion, which belongs to a past age, that shops have some special need for the introduction of gimcrack pilasters and consoles flanking their windows. It would have been a wholesome aesthetic lesson to tradesmen if they had only been taught, by the abrogation of this clause, that they could do without such sham architectural scenery.

Sub-section 4, again, reaffirms the absurd clause to the effect that no shop-front shall be fixed nearer than four inches to the centre of the party-wall, where the adjoining premises are separated by a party-wall (this conditional sentence is new), "unless a pier or corbel of stone, brick, or other incombustible material four inches wide at the least be placed as high as such woodwork and projecting throughout an inch at least in front thereof between such woodwork and the centre of the party-wall." That is to say, the woodwork is not to approach nearer than four inches to a certain point, unless there is a projection of four inches between it and that point! How, then, can it approach any nearer? Really the opportunity might have been taken to get rid of such nonsense as this. A new provision in the same subsection is that no part of the woodwork of a shop-front shall be fixed higher than twenty-five feet above the level of the pavement. That is a reasonable requirement; the whole of the rest of the paragraph is pure nonsense.

Sub-section 5 provides that:—

"In a street of a width not less than forty feet or to a building the front wall of which is not at a less distance than forty feet from the opposite boundary of the street bay windows to dwelling-houses may be erected on land belonging to the owner of the building notwithstanding the provisions of this Act relating to buildings beyond the general line of buildings in streets provided that such bay windows—"

then follow the provisions. These are (a) that the window does not exceed three stories in height; (b) does not project more than three feet from the main wall of the building to which it is attached; (c) does not project within the prescribed distance of the centre of the roadway; (d) is not nearer to the nearest party-wall than the amount of its projection from its own building; (e) does not exceed in width three-fifths of the frontage of its own building; (f) is not

constructed upon any part of the public way; (g) shall not be used for trade purposes. Here is some more blundering. The street must be at least 40 ft. wide; but according to Section 11 (f) it is obvious that the width of a street, if the houses have forecourts, is the width between the forecourt boundaries. In the case of the house whose front wall is not less than 40 ft. from the opposite boundary the bay is only to be built out *on the owner's own land*. But if the external wall of the house is 40 ft. from the external wall of the opposite boundary, and the owner has in front of him the required 3 ft. on which to project his bay-window, it is obvious that in that case the street is only 37 ft. wide, which is contrary to the Act, and contrary to the apparent intention of this section, and the bay window cannot be built at all. This is even emphasised by paragraph 4, that the bay window is not to project within the "prescribed distance" from the centre of the road. The term "prescribed distance" has been defined as 20 ft. If the front wall of the house is only 40 ft. from the opposite boundary, the bay window *must* come within the "prescribed distance." The only way out of the dilemma is to suppose that these expressions are intended to refer to the case in which it is intended to ultimately set back the opposite boundary, and the centre of the road has been "defined" by the superintending architect on a line different from the actual centre. That explanation is possible, but we do not think that any one who reads the clause will easily be persuaded to think that such was its intended meaning. It appears to us that whoever drew up the clause had got befogged amid the technical phraseology of the Act, and forgot to apply the elementary rules of addition and subtraction. The next subsection, in regard to oriel windows, provides, under the same general rule, that the window may project 3 ft., provided it only projects 1 ft. over the public way. That, in the case of the house "40 ft. from the opposite boundary," reduces the road to 38 ft. wide. If there is any explanation to be given of this curious clause other than we have been able to appreciate, we shall be glad to hear what it is, but we think a good many people besides ourselves will find the same difficulty in making consistency or common sense out of it.

The provision as to "the roof-flat or gutter of any building" (sub-section 7) runs as at present, and sub-section 8 repeats the corresponding clause "Section 26 (6)" of the 1855 Act, except that to the opening words, "except in so far as permitted by this section in the case of shop fronts," the words "and projecting windows" are added.

Section 74 deals with the separation of buildings. The present requirement that "every building shall be separated by external or party-walls from any adjoining building" is particularised further by the addition of the words (after "party-wall") "or other proper party-structure," which includes horizontal as well as vertical divisions between buildings. The words are also added at the end of the clause "and from each of the adjoining buildings if more than one." If we understand English the words "from any adjoining building" were quite sufficient without these additional words; or, at any rate, the addition "or buildings" would have entirely met the case. Sub-section 2 is a new provision to the effect that in every building exceeding ten squares (1,000 superficial feet) in area, used partly for trade or manufacture and partly as a dwelling-house, the trade and the dwelling-house portions must be separated by walls and floors of fire-resisting materials, and all the passages and staircases for access to the dwelling-house portion must be constructed of such materials. The part used for purposes of trade or manufacture (if extending to more than 250,000 cubic feet) will be subject to the provisions of the Act as to cubical extent of buildings of the warehouse class (Sections 75, 76). But openings

between the trade and dwelling-house portion, as in any other of the walls, may be made as required, if fitted with fire-resisting doors.

By sub-section 3 the present provision that in a building of more than 3,000 square feet in area separate sets of chambers or rooms tenanted by different persons shall be deemed to be separate buildings, and be divided accordingly by party-walls or fire-proof floors, is modified as follows: the minimum of area is altered from "3,600 square feet to "25 squares" (2,500 square feet); the chambers are *not* to be considered as separate buildings, but it is provided that the floors and staircases shall be of fire-resisting materials. This, though it seems at first sight less stringent than the present law, is really more so, as it demands fire-resisting staircases as well as floors. The probable object of the altered wording is indicated in the added proviso that "this provision shall not entitle the District Surveyor to charge for the inspection of each set of chambers as a separate building." The sentence is unnecessary, legally, as the phrase that such chambers shall be "deemed to be separate buildings" is abolished from the body of the clause; but the framers of the Act, in some cases so vague in expression, seem to be seized at times with a morbid desire for excessive precision. The provision as to the Surveyor not having power to charge for each set of chambers separately was absolutely required in the old Act, but was not there; the altered wording of the clause renders it totally unnecessary, but it is now inserted; such are the eccentricities of drafting.

In Section 75, already referred to, the present provision that a warehouse or building used wholly for trade or manufacture must not have a greater content than 216,000 cubic feet, or must be divided by party-walls into sections of not more than that extent, is reaffirmed with another arrangement of wording, and with the important difference that the maximum cubical extent permitted is raised to 250,000 cubic feet. The qualifying words "except as in this section provided," are inserted in the clause. This section is extended, however, by two new paragraphs. The first of these provides that no addition shall be made to any building of the warehouse class or to any division thereof, so that the cubical extent of such building or division shall exceed 250,000 cubic feet. Another eccentricity of drafting, as this clause is quite unnecessary; it is covered by the first clause. The second new clause is the one indicated by the words "except as in this section provided," and is an important innovation. It excepts from the provisions of the section any building (not within two miles of St. Paul's Cathedral) which is used wholly for the manufacture of the machinery and boilers of steam-vessels, or for a retort-house, or the manufacture of gas or for generating electricity, provided that such building consists of one floor only and is constructed of brick, stone, iron, or other incombustible material throughout, and is not used for any other purpose than those above specified. Such a building shall be considered not only (apparently) as out of the jurisdiction of section 75, but as one "to which the general rules of this Act are inapplicable." That is rather an unnecessarily large concession which may lead further than was quite intended, especially as there is not even the usual provision that it should be done "to the satisfaction of the District Surveyor."

Section 76 provides that, in the class of buildings dealt with in the preceding section (those warehouses which are restricted to 250,000 ft. cubical extent), the Council, if satisfied by the report of the Superintending Architect and the Chief Officer of the Fire Brigade that additional cubical extent is necessary for any particular trade, and that proper arrangements have been made for lessening, as far as practicable, the danger from fire, may consent to an additional cubical extent, but only under the following con-



ditions: (i) that the building shall not extend to more than 450,000 cubic feet or any less number allowed by the Council, without being divided by party-walls, so that each division does not exceed that cubical extent; (ii) that the building is not more than 60 ft. high; (iii) that it is not used for any trade involving the use of explosive or inflammable materials. The consent is only to continue in force as long as the building is actually used for the purposes for which the permission was granted. All this is a sensible and well-considered concession to some of the requirements of modern manufacture on a large scale.

Section 77, on "the uniting of buildings" re-enacts the provisions of Section 28 of the 1855 Act, with the following additions: To the sentence "wholly in one occupation" is added "or constructed or adapted to be so"; "250,000" cubic feet is of course substituted for "216,000"; to the clause limiting the height and width of openings in the party-wall is added the requirement that "such openings taken together shall not exceed half the length of the party-wall on each floor," a very necessary condition, as at present the wall might consist of a row of large doors and narrow piers and the law could not interfere, provided the area of the doors was not more than half the area of the whole wall of the story (Section 54, Subsection 2 c); wrought-iron sliding doors in grooved or rebated iron frames may be substituted for hinged doors; if the wall is at least 2 ft. thick and the doors at least 2 ft. apart they may be 9 ft. 6 in. high instead of 8 ft.; the brick or stone wall blocking up the openings when the buildings cease to be united need not be more than 13½ in. thick (whatever the thickness of the wall (we cannot approve of this at all, it does not make what builders call nearly such a "good job" as building up the opening the full thickness of the walls). Lastly, when the buildings which have been united cease to be under one occupation, "the owner thereof" shall give notice of the fact to the District Surveyor, and shall forthwith proceed to block up the openings in the manner prescribed. "The owner thereof" is a phrase admitting of some ground for dispute. It means of course the person who owned the two buildings when united, but when they have ceased to be "in one occupation" there are two owners, and there would be some opening for one to try to throw the onus of the work on the other.

Section 78 is a repetition of Section 30 of the 1855 Act providing (in the same terms) that every public building, notwithstanding anything in this Act, shall be carried out to the satisfaction of the District Surveyor, or in the event of disagreement to that of the Tribunal of Appeal (instead of the "Metropolitan Board" as in the old Act). But two new clauses are added, to the effect that no public building shall be occupied as such till after the approval of the District Surveyor or of the Tribunal, and that after such approval no work likely to affect the building shall be done on it without the approval or certificate of the District Surveyor.

The rules for the conversion to a public building of a building erected for other than a public purpose are given (Section 79) to the same effect and in nearly the same words as in the existing law, only substituting "the Tribunal of Appeal" for the words "the Council"; the reference to "the Metropolitan Building Act of 1855 and the Acts amending the same" is of course struck out.

Section 80 gives detailed and in most respects new directions as to staircases in churches and chapels, meeting-houses, public halls, lecture-rooms and exhibition-rooms, and places of assembly, the summary of which is as follows:—

(a) Stairs to be enclosed by brick walls at least 9 in. thick, and treads of uniform width (this latter rather vague expression probably means that there are to be no "winders," though the words will admit of another interpretation);

(b) No staircase to be less than 4 ft. 6 in.

wide unless where the accommodation is for not less than 200 persons, when they may be 3 ft. 6 in. wide:

(c) Staircases, corridors, and passages to be increased by 6 in. in width for every 100 persons above the number of 400, up to a maximum width of 9 ft.; staircases more than 6 ft. wide to have a handrail in the middle; two staircases, corridors, or passages may be substituted for one provided they are each two-thirds of the width required for the one, except that they must in no case be less than 3 ft. 6 in. wide:

(d) Where the public are accommodated at different levels, a separate staircase or corridor must lead directly to the street from each level:

(e) All doors and barriers must open outwards, and no outside locks or bolts are to be affixed to them.

A building formed under or by the enclosure of a railway-arch, and adapted to be used for human habitation, must conform to all the regulations of the Act, in the same sense "as if the building were built in any other position."

In regard to temporary structures, the provision in Section 56 of the 1855 Act in regard to iron buildings is adopted (Section 82) in nearly the same words as at present, with the addition, after the word inapplicable, of the words "or in the opinion of the Council inappropriate having regard to the special purpose for which the building or structure was designed," which gives a further power of discrimination in regard to the application of the provisions of the Act. The remaining provisions in respect to this subject are the same as at present, though arranged and worded rather differently, but Section 83 introduces an important and most desirable new provision to the fact that where the Council think fit, in accordance with the preceding section, to approve of the erection of an iron structure, they may limit the time during which it shall be allowed to remain and make such conditions as to its removal as they may think fit, and if the structure is not removed at the specified time the Council may summon the owner or occupier, and the Court may authorise the Council to enter on the land, remove the structure, and sell the materials unless their expenses in removing them are repaid within fourteen days.

The law as to wooden temporary structures is modified in wording by the sentence "except hoardings enclosing vacant land and not exceeding in any part 12 ft. high." Hoardings to land which is not "vacant" are not dealt with in the Act.

Section 85 provides that this portion of the Act shall not apply in the case of a pile, stack, or store of timber not being a structure affixed or fastened to the ground.

Structures or erections on the premises of any railway company and used for the purpose of or in connexion with their traffic are exempt from the operation of this part of the Act.

This completes the legislation as to new structures.

#### NOTES.

THE Royal Commission appointed to consider the conditions under which the City and County of London can be amalgamated, have presented an interesting Report. It has, however, the fatal flaw of being based on the assumption that Parliament is in favour of the amalgamation of the City with the rest of London. As a matter of fact, Parliament has never yet declared for such amalgamation, and, therefore, any scheme for carrying it out is obviously premature. But as the Government of the day set the Commission this academic task to perform, it was bound to do its best, and the result is the Report in question. Briefly stated, the Report recommends that there should be one Municipality for London, which should absorb both the existing County

Council and the Corporation of the City. But, in fact, this would be no more than the addition of eight members to represent the City to the present County Council. The Commissioners further recommend the creation of several minor Corporations to undertake the work of the present vestries and district boards, and of the Commissioners of Sewers in the City, such as highway, sanitary, and similar duties. The greater Corporation would exercise the present functions of the County Council and the Corporation of London combined, such as the administration of main sewers, main roads, fire brigade, and so forth. That the creation of a number of minor Municipalities in place of the existing local bodies would be extremely desirable cannot be doubted, and we see no reason why this should not be done. It does not in any way involve the amalgamation of the City Corporation and the County Council, which is a matter for much consideration. No doubt the creation of a single Municipality would introduce a greater uniformity of local government in the Metropolis. But whether there is sufficient reason for such a change is most doubtful. The City of London is a district of very special characteristics, the like of which in wealth and historical renown is not to be found in the world, and the Corporation performs its functions to the satisfaction of the citizens and of the country generally. What would be the practical advantage—as distinguished from a mere paper symmetry—of an amalgamation of the City with the County Council is not clear. The County Council has work enough and to spare; it can, by the efficient and dignified performance of its duties, obtain all the honour that it can wish for. London is large enough both for the Corporation of the City and for the County Council, and the former has a special place in the country to fill. At present we do not perceive sufficient grounds for what would be the practical abolition of the historic Corporation of the City of London, and this report, able and ingenious as it is, does not make the proposed amalgamation look more desirable.

THE loss of tradition concerning the making of beautiful things, and public indifference to the fact, seldom, we imagine, makes itself so evident as when the Church presides over an exhibition of "Ecclesiastical Art." The association between worship and beauty was once so close that one cannot but feel the pity of it when an opportunity is thrown away of showing that this association is not absolutely broken. And there could be no fitter time for such demonstration than the occasion of a Church Congress. For there is no doubt that the clergy are, as individuals, deeply interested in the matter of making their churches beautiful. They are, for the most part, liberal in their ideas and willing to be guided. Where competent advice is not followed, it is more often the fault of the churchwarden than of the parson. Yet we find at Exeter again, as we have found elsewhere, a so-called Exhibition of Ecclesiastical Art, opened in state by the Mayor, and under the immediate patronage of the Bishop, containing nothing more original than may be seen in most shop windows. By such an exhibition church ornament and furniture are being advanced in no way. It is merely leaving such things where they are found. Or worse even, for side by side with altar or lectern which may possess some claim to merit, you find a stall purveying diamond cement, the Chicago World's Fair challenge set of pen and pencil, or someone who will sell you non-intoxicating orange champagne at 6s. the dozen. In place of these latter at least we might look for something original in modern design; the publications of the Fitzroy Society, cartoons for windows by Kempe, or such finishings as have so added to the beauty of Holy Trinity, Sloane-street. As the exhibition is arranged with the spaces



leased out by a promoter at so much a yard, one could not have hoped for such assistance, but it might have been otherwise. To turn to the exhibits, there is the usual supply of brass eagles, distributed between such firms as Messrs. Willis & Jones, Benham & Froude, Hart & Son, or Whipple. Messrs. Willis & Jones have, in addition, a handsome wrought-iron lectern for St. Matthew's Church, Tulse Hill. Several stained-glass firms are represented, and as far as designs go, we prefer those by Messrs. Heaton, Butler, & Bayne, made, we fancy, by their clever draughtsman, Mr. Wilson. This artist gives height and a largeness of scale to his figures that always tell. Messrs. Savel & Co. have some neat examples of the use of lead tracery, throwing the lead into curves and sweeps in place of keeping it uniformly flat. The late John D. Sedding was one of the first to adopt this treatment, and it is very effective with white glass. Messrs. Burnet & Co. have some very cheap materials, plush and silk ground tapestries quite telling in themselves, and so getting rid of the necessity of some indifferent embroidery. The embroidery on view from several firms and sisterhoods is, generally speaking, not interesting. The festival grounds of heavy greens and reds overload the colour schemes, and the designs are stiff without being mediocrally quaint. The freedom of some of the sixteenth and seventeenth century Italian work in foliated design might surely serve as an example, and there lies a fine chasuble of such a kind hard by. There is a small loan collection of old church plate, but it is in a case and not easy to examine. It contains a handsome chalice from the parish church near Truro, made (according to the date-letters given by Cripps) in the first quarter of the sixteenth century. If there is any difficulty about securing first-class modern work, why not confine such an exhibition to objects of like value? One welcomes the Arundel Society, with its familiar pre-Raphaelite saints and scenes; and equally welcome is a fine bookstall of the Oxford University Press, where Professor Skeats' last volume of Chaucer beckons you from the shelf. We are bound to say that the books come somewhat as an oasis in the desert. We remember once hearing Mr. Walter Besant complaining bitterly that the author did not rank as an artist. We failed to see at the time in what way the author was the sufferer. We are at any rate convinced of the superiority of his craft at an Ecclesiastical Art Exhibition.

THE proposal to reproduce a part of "Old Berlin" at the 1896 Industrial Exhibition at Berlin has been approved of by the Historical Society, and the quarter chosen will probably be that near the Muhlendamm, adjacent to the Spree. The first meeting of the various sectional committees for the Exhibition after the recess was held last week, and great progress in the organisation is reported from all sides. The number of applications for space assures the success of the undertaking. The last day for receiving these is fixed for November 15; the space allotted to the various buildings is nearly five times as extensive as was required at the last exhibition in 1879. The executive offices are at 160, Gartenstrasse, Berlin.

OUR neighbours on the other side of the Channel do not seem to be as fortunate in the matter of coal finding as the promoters of the Channel Tunnel scheme. Flushed by the success of the engineer of that undertaking in discovering coal at Dover, and buoyed up by the knowledge that coal exists and is worked in the Boulonnais, a few French capitalists some months ago put down a trial boring near Calais. M. Gustave Dollfus, an eminent French geologist, plainly told the executors of the new *forage* that they were running great risks in venturing their money, but that there was just a possibility of success. The nearness of the selected spot to Dover,

and the fact that, under normal conditions, the coal was bound to strike across the Channel, were factors in the problem that could not be resisted. So the boring was prosecuted with considerable vigour. We now learn that at a depth of 335 metres the tools have alighted upon rocks of Devonian age. In other words, they have found the formation that under ordinary circumstances occurs *beneath* the Coal Measures. Nevertheless, the bold *entrepreneurs*, though it is only a few days since the mortifying discovery was made, have decided to go on with the work. Judging from the known disposition of the rocks along the line of strike, it is just possible that these Devonian beds are inverted, or thrust-faulted, and that the Coal Measures may be found under them after all. The problem now presented is very similar to that obtaining in the London area. Here also we have found Devonian rocks, but no one has had the courage to test their thickness. If the French really do find the Coal Measures at Calais, after what has happened, it will render the occurrence of coal under London almost a certainty.

IN the sale of some properties, mostly grazing-farms and building-land, in the Blackmore Vale district, otherwise known as White Hart Forest, is included the "Old House" at Blandford. The house escaped from the fire which, in 1731, consumed nearly all the town. It was built, somewhat after his native style, by Joachim Sagittary, *obit* 1696, locally called the "High German Doctor." Having a high-pitched roof with attics, it is of red brick, the walls being distinguished by a liberal amount of string-courses, mouldings, and projecting blockings made, for the most part, by cutting and rubbing *in situ*. Two chimney-stacks collect the flues; each has a bold cornice, above which the stack is splayed into an octagon with a detached column before each face, and a dado and entablature breaking round the whole. A view, with details, will be found in Hutchins's "Dorset," third edition, 1868. After the fire the Town Hall was rebuilt after the designs of John Bastard, of Blandford, who also, with William Bastard, built the church, in the Classic style, 1738-9. The district in which the properties are situated was familiar to Fielding, who passed much of his boyhood at East Stover, in a stone-built farmhouse that was demolished sixty years ago.

THE annual report of Mr. Norrington, the Surveyor to the Vestry of Fulham, contains among other matters of interest some information as to recent experience with wood paving, in the form of schedules. The Surveyor is very anxious to encourage the use of the hard Australian woods for this class of paving, and points to an example of the unsuitability of deal in the case of some paving in the North End-road, Fulham, which was laid down in January, 1889, and is now unfit to remain through the coming summer. Taking the largest area of wood paving proposed to be laid down, 13,100 square yards, we find the results as follows:—

	Creosoted deal.	Karri-wood.	Jarrah-wood.
Cost per yard, including allowance for repairs	12s.	15s.	15s.
Total cost	£7,860	£9,825	£9,825
Annual cost spread over duration of wood	£1,137	£796	£315
Probable duration	8 years	16 years	15 years

The figures are conclusive in favour of the Australian woods in a financial sense, while in every other respect a close and compact wood must be better than a soft one. In regard to pavements generally, the Surveyor (who has no scruple about lecturing his Vestry roundly) objects strongly to the multifarious pavements used in the district, especially as the gas, water, and other companies are constantly disturbing them, and the difficulties of proper repair are much increased, by the variety of materials used. "The

Vestry should decide on using one material for main thoroughfares and one for side roads." It is noted in connexion with this subject that the price of the best artificial stone is nearly the same as York, but that "whenever the pavements are disturbed a far greater number of artificial stones are broken than in the case of York." A large amount of work is to be done in the way of new ventilating to the sewers. The following passage as to the inspection of sanitary fittings of houses suggests matter for reflection:—

"By the resolution passed on December 22, the Drainage Inspector's duties were increased by an order to inspect *All the sanitary appliances of new houses*, in addition to his previous duties of testing and inspection of the drains, soil-pipes, and water-closets, and this term would include water cisterns and dust-bins. The Drainage Inspector is further required to check the erection of the forecourt walls, to see that the roads are the required widths. Has the Vestry any knowledge of the value of the work this represents? Taking the value of the work to each house to average 30l. (a low figure when it is remembered that the large blocks of flats now being erected cost for drainage and sanitary fittings many hundreds of pounds each) it gives the enormous amount of 24,000l. as the money expended on this class of work in Fulham in one year. An expert surveyor in private practice would receive 5 per cent. remuneration, equal to 1,200l., and expenses. The Vestry does not spend 250l.

It is quite impossible for only one Drainage Inspector to supervise all this work, and I may say that practically only the soil-pipes and drains are tested and inspected, and that *all the sanitary appliances of new houses* are left, to a great extent, to the discretion of the builder, although they closely touch the future health of Fulham."

Mr. Norrington's experience entirely confirms the opinion we expressed from the first that it was a mistake for the Vestries to make themselves responsible for the cleaning of the footwalks in front of houses, especially in regard to snow, "if only on account of the time which must necessarily elapse between the commencement of a fall of snow and the setting on a sufficient number of men to cope with it. Parliament ought rather to have enabled the Vestry to take proceedings against householders and owners of property who did not clear the footpath in front of their premises."

WE have also the annual report of Mr. Weaver, Surveyor to the Kensington Vestry. Part of the report is occupied with a consideration of the London County Council's By-laws as to house drainage, some portion of which, being framed in reference to the Public Health Act, will, it is pointed out, lead to a conflict of jurisdiction between the District Surveyor and the parish officials, the former having nothing to do with the Public Health Act, and being bound to pass plans when submitted to him so long as they are in accordance with the Building Act. The whole analysis of these by-laws is a very useful one. We learn from the Report that increased attention has been given to the cleansing of the highways, especially during the summer, when cholera was threatening; every wood-paved road was washed and swept daily, and the roads wherein markets were formed on Saturdays were washed and swept every Sunday morning. In washing creosol was mixed with the water, so as to disinfect the road surface. Gullies were also liberally flushed, about 50,000 gallons of creosol and water being poured down them daily. In regard to this question of keeping streets in a sanitary state, we cannot but regret to see in the Report such a large list of wood-paved streets. Even constant washing cannot avail to keep wood-paving in as sanitary a state as asphalt or granite.

FROM our report of the proceedings of the London County Council it will be seen that the associated London water companies have unanimously refused to pay any attention to the request of the Council, backed by the opinion of some of the first sanitary experts of the day, that they would alter their limit for water-closet service cisterns



from 2 gals. to 3 gals. With admirable assurance, the water companies deign to add that they would be glad to concur in any arrangements "reasonably required for sanitary purposes without involving consumption of water for useless objects." So that the companies who deal in the water, who are not sanitary authorities, and whose interest it is to curtail the supply of water for the benefit of their shareholders, are to be the judges of what is useful or useless in the consumption of water! The Local Government Board has now been appealed to, and it is to be hoped they will take immediate and decisive action.

# MAGAZINES AND REVIEWS.\*

THE *Art Journal* contains an article "On the Banks of the Rhine," with reproductions from one very good brush sketches by Mr. F. Williamson. An article on "Birmingham Brass Works," by Mr. O'Fallon, contains examples which look pretty well in illustration, but which, we fear, owe some of their good effect to being not too precisely shown in detail in the mode of illustration adopted. We observe that all the designs are given as by "Messrs. — & Co." not with the name of the person who actually designed and executed them.

The *Magazine of Art* includes an article on the "Town and Cloth Halls of Flanders," by Mr. Alexander Ansted, with very free and effective sketches, in which however the architectural forms and details are hardly indicated at all. This method of sketching buildings produces picturesque illustrations, but must not be expected to satisfy those who are seriously interested in architecture.

The *Architectural Review* (Vol. III., No. 3) gives some account of the life and career of Charles Bulfinch, an early Boston architect, born in 1763, with illustrations of some of his works, including University Hall, Harvard College, and the Massachusetts General Hospital at Boston, a long print front with the orthodox portico in the centre, now pleasantly grown over with ivy. The same number contains an illustrated account of the Academy at Athens, a building "constructed of marble from the same quarries as the Parthenon," from the designs of Hansen, of which we illustrated the exterior elevation in January, 1884; the *Review* gives a good many others, including a large view, from a photograph, of the interior of the Main Hall, in which the questionable expedient of a hypæthral opening in a sloping roof, which some critics want to attribute to the Parthenon, is practically illustrated.

In the *Nineteenth Century* Sir C. Robinson, under the title "English Art Connoisseurship and Collecting," gives an interesting historical sketch of the changes in taste and in the market value of different classes of works of art, since the period when the taste for collecting works of art was developed in this country.

The *Fortnightly Review* contains an article by Mr. Frederic Harrison with a very fascinating title, "An Antiquarian Ramble in Paris," but very disappointing and superficial. It is in fact merely a set of reflections, based on some popular and superficial guide-books, in regard to the great antiquarian interest of Paris; an interest which no one who knows anything of the history of Paris can ever have questioned. Mr. Harrison seems rather under the impression that this is a new light to every one else because it is so to himself, and he seems to have been content with purely "popular" sources for his information.

In *Harper's* "Lahore and the Punjab," by E. Lord Weeks, is a general article, but contains some illustrations of architecture and some notes on the buildings of Lahore. "The banks, public buildings, and Government offices are massive rectangular arched structures of pale yellow stone, each standing alone in a waste of gravel;" this is in the European quarter. The new "Scinde Club" is mentioned as a typical example of the Indian club-house generally. The illustrations are all of the ancient architecture and the people. "Golf in the Old Country," by Mr. Whitney, will interest many readers of all professions, and is illustrated by views of different golf-links and club-houses.

In the *Century* the most important article of

artistic interest is by Mr. Brander Matthews; it is called "Commercial Bookbinding," but it is intended to show how artistically good are some of the bindings now produced for ordinary issues of books, and some of the illustrations given fully bear out the remark. They are, however, we think rather exceptional. The "Old Dutch Masters" article for this month, by Mr. Timothy Cole, treats of Paul Potter, with an engraving of one of his well-known and (in its way) splendid work "The Young Bull."

In *Scribner* Mr. H. G. Prout writes an interesting article on "Railroad Travel in England and America," the illustrations of which are almost all of English stations and railroad carriages, in which American readers may be supposed to feel more interest than in those of their own country. The writer does full justice to the many good points in English railway travelling, and is, on the whole, quite impartial in his treatment of the subject. He even suggests that our system of looking after our own luggage has its advantages, and we gather incidentally that under the American "check" system of delivery, a traveller may have to wait some hours at a house or hotel before his luggage is delivered; a serious inconvenience which the English traveller is saved from by our system (or no system), however troublesome it may seem sometimes at the moment of coming to the end of a journey with a quantity of luggage. Mr. Prout expresses great admiration for the large English terminal stations both in their general appearance and in the comforts annexed to them—waiting-rooms, large booking-offices, dining-rooms, lavatories, &c. In these things we are declared to be an example to the whole world, American stations being "barbaric" in comparison.

In the *English Illustrated* "Troy Town Revisited," by the author of "The Delectable Duchy," is a quaint description of manners and life in a small Cornish port, illustrated by some pretty sketches of old bits of buildings, quays, &c., by Mr. J. E. Rogers. Another topographical article is that by Mr. F. Dollman, of Cardiff, under the title "The Man and the Town," the "man" being the Marquis of Bute, whose portrait forms a frontispiece to the article, which is illustrated by reproductions from various photographs of the castle and the town.

In the *Pall Mall Magazine* the article most interesting to artists is that by Mrs. Pennell, entitled "Out of Our Window," a window looking on the Thames, illustrated with a number of charming sketches by Mr. Pennell. "Westminster" is the second of a series of articles by Mr. Walter Besant, illustrated by Mr. W. Patten; some of the illustrations being copies of old engravings or drawings of different portions of old Westminster Palace after the fire. "Vanished Rome" is an article by no less an authority than Signor Lanciani, but the illustrations, very good as they are, have mostly little or nothing to do with Rome, including as they do the Cathedrals of Pisa, Orvieto, and Salerno. The illustrations of the number almost throughout are excellent, which unfortunately cannot be said of all the writings.

The *Cornhill* includes a pleasantly-written and picturesque article on "Abu-simbel" and "Rameses II." and a short chat about "The Humours of Heraldry."

In *Blackwood's* "The Streets of Paris Forty Years Ago" does not refer so much to streets in the architectural sense as to the people who frequented them, but it is an interesting reminiscence in every way, and the placard of the man who took portraits in the streets is worth quoting:—

"Portraits!	
Ressemblance frappante ...	2 francs.
Ressemblance ordinaire.....	1 franc.
Air de famille .....	50 centimes."

There is a hint for portrait-painters anxious for business.

The *Antiquary* includes among its special articles "Notes on the Folk-lore of Bells," by Mabel Peacock, and an article on Denton Hall, one of the few remaining Jacobean houses in Northumberland, with some illustrations. We regret to hear that Dr. Cox, who has long edited the *Antiquary*, is retiring from it, and the November number will be the last under his editing.

The *Illustrated Archaeologist* (quarterly) contains a well-illustrated article by Mr. Leonard W. King on "Ashurbanipal: His Books and Buildings," and an interesting article by Mr. W.

Christian Symonds on "Sussex Iron," illustrated by many sketches of old ironwork.

In the *Essex Review* (quarterly) the old churches of St. Mary, Salcot Wigborough, and St. Mary the Virgin, Salcot Virley, are described and illustrated by Mr. F. Chancellor.

The *Reliquary* (quarterly) includes "Notes on the Cathedral Churches of Sweden" by Mr. T. M. Fallow, with some small illustrations; "The Pre-Conquest Churches of Northumbria" by Mr. Clement Hodges, and the "Heraldic System of Signs and Sign-boards" by Florence Peacock.

# SANITARY CONGRESS AT LIVERPOOL.

ON the closing day of the Congress Dr. Thomas Stevenson, President of the Chemistry, Meteorology, and Geology Section, read his address, which dealt with the subject of the filtration of water. He alluded to the fact that bacteria were now recognised as the main agents in the purification of water, and that the micro-organisms in water were of two kinds: (a) pathogenic, or disease-producing, and (b) beneficent, or purifying organisms, to which should perhaps be added a third kind—inert organisms—acting possibly as purifying agents. But we remained still almost entirely in the dark as to how far pathogenic bacteria are destroyed by the non-pathogenic. The most interesting subject for investigation for sanitarians and the public was, what were the results brought about by sedimentation, solution, oxygenation, dilution, and light, and by the living processes of vegetable and animal organisms contained in water. The experiments of Franklin and Ray Lankester showed that by sedimentation all bacteria might be removed from water, but it could only be done under favourable circumstances, and when supplemented by other means of purification. Professor Percy Frankland had pointed out seventeen years ago the bactericidal effects of sunlight, but further experimental observation required to be made as to the effects of dim light upon the bacteria contained in water.

The notion that organic matter *per se* should be regarded as injurious to health must be laid aside, but there was danger in trusting too much to the purifying effects of light, air precipitation, and even filtration, and in neglecting the urgent necessity everywhere existing to protect our water supplies from pollution.

Papers followed on the "Health of Workmen in Chemical Factories," "Humidity in Cotton Mills," "Smoke Prevention," and the "Atmosphere of Liverpool," of which the first read by Mr. A. E. Fletcher, Her Majesty's Chief Inspector under the Alkali, &c., Works Act, was the most important.

In the Engineering Section several papers dealing with the management of sewage farms, the filtration and purification of sewage water, and the utilisation of sewage effluent for willow farming, were read, but the paper of greatest interest to our readers was one which properly belonged to Thursday's programme;—that on "The Purification of Exit-air from Hospitals for Infectious Diseases," by Mr. W. Henman, architect of the new Birmingham General Hospital. The system of screening the outgoing air, adopted at that hospital by Mr. Henman, has already been fully described in our columnar Mr. Henman observed that it was essential to the success of any method of artificial ventilation that its action should be uniform at all times, by night as well as by day, and when, as in all cases where purification depended on heating apparatus, uniformity was dependent upon the efficiency of the stoker, uniformity in this sense could not be regarded as secure. In a method of heating and ventilation devised by Mr. William Key, C.E., and carried out by him at the Victoria Infirmary, Glasgow, as well as in several other large buildings, propulsion instead of suction was employed, and this, after the inspection of all the systems in use in England, was the only one that had given, in his opinion, satisfactory results. The committee of the new General Hospital at Birmingham, on which 200,000l. are to be spent, had therefore resolved to adopt this method in providing their hospital with the means of cleansing, warming, and humidifying no less than 20 millions of cubic feet of air per hour, and for propelling it into the building, thus doing away with the necessity of open fires or steam or hot-water pipes, and requiring no opening of windows. The important feature of the Key system was an air-washing screen which cleansed the incoming air of all dirt and fog, destroyed flies and insects and entrapped a very large proportion of disease germs present in the atmosphere. The experiments proved that by keeping the screen moistened with

\* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

\* We received the October number before the middle of September. If things go on at this rate, we suppose presently magazines will all be issued a month before that of which they bear the date.



water the air was maintained in a proper state of humidity, and the remarkable phenomenon was observed of the air being moistened when too dry and being dried when over moist. To the design of Mr. Key the author added screens (somewhat similar to those employed by Mr. Key at the air intake), one at the head of every bed, a means being also provided of keeping the screens charged with a disinfecting fluid. In the new buildings an outlet flue would be provided at the back of each screen, so that as fresh air was constantly being propelled into the ward an equal quantity would be forced through the screens, all other outlets being stopped; consequently, almost immediately the air became contaminated, it would be again purified, even before it actually left the apartment, and thus purified air would pass up the flues and into the open.

The screens when independently tested by Dr. Sims and Dr. Cartwright Wood were found to permit the passage of only from one-third to one-fourth of germs of all kinds, and in their report these experts pointed out that still better results might be obtained by the use of finer screens. Among the economical results claimed for the system, besides much smaller initial cost than with heat purification, and the total elimination of the cost of maintenance, in fuel, cleaning, &c., was a reduction in the necessary cubic air space per bed. The author contended that with suitable appliances, by which the air could be constantly and quickly changed, buildings might be less in cubical capacity by at least one-third. Not only would this reduction in size more than compensate for the cost of the apparatus and its working, but the daily labour and charges for heating, lighting, cleaning, administration, and maintenance would be proportionately less. There was no doubt now about the effective elimination of germs by the screens; the only question left was as to the best form of screen. He proposed to use a finer Manila fibre for his screens.

A discussion followed in which Dr. Vacher, Sir T. Crawford, Surgeon-Major Black, and several other experts took part.

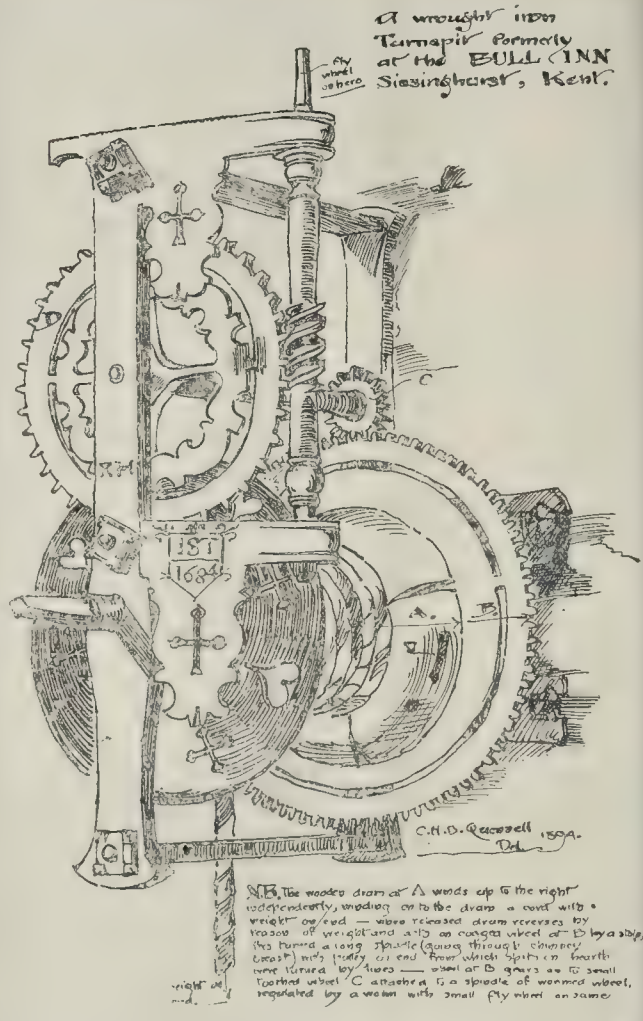
Dr. Francis Vacher (Birkenhead) thought there would be a difficulty in effectively ventilating hospitals by propulsion, or, if it were done, that the results might easily be mischievous rather than beneficial. He had recommended moistened screens in a report he had drawn up many years ago upon the effects of noxious fumes in the vicinity of chemical works.

Surgeon-General Sir Thomas Crawford said the novel scheme proposed was one that required very careful consideration. He had had a very large experience of hospitals, and of screens for purifying the air of buildings. In hot climates our army was served out with apparatus for the circulation of air, and with screens very much like those here proposed. His experience of the process of forcing air into buildings was not in its favour. The difficulty was to regulate the amount of moisture, and he was not sure that they did not add more deleterious matter. The proposal to purify the air of hospitals was a retrograde one. The only safe and sound means for the supply of air was the natural one of obtaining it from a pure source in a free and natural flow.

In the course of the discussion the beneficial results obtained by sterilising the air of hospitals by means of the antiseptic process of Lister were pointed out, the correctness of the principle of admitting air at the top was questioned, and it was pointed out that any proposal to reduce cubical capacity, from motives of economy, was a retrograde step which the Sanitary Institute ought not to endorse; that all mechanical arrangements of the kind were apt to get neglected and fall into disuse, and that no figures had been given to show the actual economy of the scheme proposed.

Mr. Henman, in reply, said that all that Sir T. Crawford had advanced, he had heard hundreds of times. It was not likely that the authorities of Birmingham would sanction an expenditure of 200,000l. without having made ample enquiry on all points. He had been all over the country, and found everywhere that the cry was for ventilation, and the conviction was that it must be obtained by mechanical means. Where these had failed, it was because they had not been well managed. They could not always select a site in the midst of pure country air; they must often have their hospital in the centre of the town. Whether they had or had not hit upon the proper system, that system must be found. The thing must be done. In three or four years' time if they went to see the General Hospital at Birmingham, he believed they would admit that it had been done.

A paper by Mr. Robert Williams was then read, on the "Nation's Wealth," which was



mainly on what may be called the political economy of sanitation, and was of a somewhat exaggerated and pessimistic character. Mr. James Walker (Liverpool) read a paper on "Domestic Boiler Explosions, their Cause and Cure," in which the action of one of the exhibits at the Health Exhibition held in connexion with the Congress was explained by the inventor. Boiler and cylinder explosions were ascribed to the formation of steam under pressure in a way that choked the safety-valves or other steam vents, and the means adopted for avoiding the formation of steam in such cylinders was described. There were no safety-valves or mechanical working parts in this arrangement, the water supplied, though very hot, being always a little below boiling-point. Hence no danger could ensue when the outlet might have been frozen up. A separation was made between the cylinder containing steam and water from the boiler and the cylinder supplying hot water for domestic use, the water in which was heated by conduction only, and was never liable to come into contact with red-hot or over-heated surfaces. This arrangement allowed of the lower cylinder, which was the only one containing the steam circulating from the boiler, to be freely ventilated, so that steam, if produced, could never be a source of danger. The water in the upper cylinder, which alone circulated in the house-pipes, being heated only by conduction, was not able to generate steam, and therefore could cause neither explosion nor collapse. The domestic boiler was supplied through an automatic syphon feed, which,

it is claimed, prevents water entering the boiler when empty.

Papers were also read on two other exhibits by Mr. Wm. Darley, on the "Purification of Sewage and Foul Waters by the Magnetite Filter," and the "Filtration of Sewage by the Lowcock System," read by its inventor, Mr. S. R. Lowcock. "The Tub and Pail System" was the title of a paper read by Mr. G. J. C. Broom, C.E. (Borough Engineer of St. Helen's), which stated that there were twenty-four towns in England in which the "Tub and Pail" system was still largely in use. Fifteen of these towns, mostly in Lancashire, with a population of 2,599,633, had 232,334 pails, 136,444 water-closets, and 92,239 privies. The system was exclusively adopted in Rochdale in 1869, where great difficulties with contractors were previously encountered in the removal of excreta from the 4,000 middens then existing in the town. The middens and old privies now numbered only 138 for nearly double the population (72,325 persons), and the water-closets only numbered 650, while of pail-closets there were 18,147. The author condemned the system from many points of view, as well as on account of its heavy cost. In St. Helen's almost alone had any exact record of the cost of collection of the pails been kept. With a collection once a week, the average cost per pail per week had been found to be 2'368 pence, but a perfect pail system would require daily removal at six times the cost—a cost absolutely prohibitive. With all its disadvantages, the author regards the pail system as



an immense improvement on the old middle system, and in the great towns of Lancashire and Yorkshire great reductions in the death-rate have followed upon its introduction.

In the course of the afternoon's discussion the absolute necessity of measures for the protection of rivers from pollution was strongly insisted on, one speaker pointing to the non-tidal section of the Manchester Ship Canal as an awful example of "a sink of iniquity."

At the close of the sitting a hearty vote of thanks was accorded, on the motion of Sir F. S. Powell, to the readers of papers and to the Council of University College for the use of the noble engineering theatre in which the meetings had been held.

At the general meeting of the Congress, which was held subsequently in the main theatre, the same and several other votes of thanks were accorded, the President of the Congress (Sir F. S. Powell), the Earl of Haddington, the Lord Mayor of Liverpool, Sir C. Cameron (ex-President), Sir T. Crawford, Major Lamorock Lower, Professor Hele-Shaw, Mr. Rogers Field, E.E., Mr. H. H. Collins, Mr. Symons (Registrar, Sanitary Institute), Mr. H. P. Boulton, C.E., and Dr. Sykes, taking part in the proceedings. The declaration of the President that the Congress just concluding had been, perhaps, the most successful and interesting that had ever assembled since the Institute was founded, and that its debates would lead to important future results, was generally accepted and cordially approved.

The Sanitary Exhibition held in connexion with the Congress was more extensive than any of its predecessors. The most important exhibits were contained in the section "Hygiene of Building Construction," which included heating and ventilating apparatus, baths, sinks, closets, waste meters and preventers, tiles, sanitary pipes, filters, and sewage purification apparatus. Most of the following exhibits were rewarded either by medals or certificates. Messrs. Doulton & Co., on a central stand near the entrance, showed specimens of glazed fire-bricks in "Old Gold" and other colours, with many objects of terra-cotta and glazed ware, baths, lavatories, sinks, and closets. The firm received a medal for their invention for making an effective soldered joint between metal soil-pipes and stoneware traps. Flanking the Doulton stand were two others nearly as extensive, that of the Albion Clay Co., Woodville, Burton-on-Trent and that of Messrs. Jos. Cliff & Sons (Wortley). Among the newest things shown by the Albion Clay Co. are the channel bends for manholes and inspection-chambers of Messrs. Jones & Sykes, the improvement in which consists in arching over the outlet and of the bend. A lip is formed in the upper part of the channel bend to prevent sewage splashing, and there are other improvements in this form. An improved form of socket-pipe, called by the company the "Paragon," is shown on this stand, which has the sockets eccentric instead of being concentric, which, as stated, makes it impossible to lay them with a defective invert. To insure true alignment of the invert in laying, the workman must lay the pipes so that the word "Paragon" is always on the top. The sockets are flattened at the base to give them a firm bearing, and at the lower part are thickened and deeply grooved to hold the jointing material so that it cannot be forced out. At the stand of Messrs. Cliff & Sons many porcelain baths, lavatories, slop-sinks, &c., are shown, medals being awarded both for the "Imperial Porcelain Bath" and the "Cecil Porcelain Slop-Sink." On the two sides of the hall were shown Merrill's self-emptying lavatory, siphon cisterns, and syphonic discharge closet, shown by the Water Carriage Engineering Company, Sheffield; Dicksee's Syphonic Closet and Shank's "Instantan," "Modern," and other lavatories in various forms, shown by Messrs. Shanks & Co., Glasgow, and the "Adamant Syphonic Latrine," "Twyliffe Closet Basin," and "Athena Lavatory Basin," shown by Mr. T. W. Twyford (Cliffe Vale, Hanley), all of which had merits that induced the judges to hold them over for further consideration before making the final awards, but certificates were given in the first list of awards to Mr. Twyford for the Athena Lavatory Basin, and another for the "Ideal Sink" and supports in enamelled fireclay, to Messrs. Shanks & Co. two certificates for lavatory basins, to Messrs. Doulton & Co. for their glazed fire-grates, and Messrs. Cliff & Sons for white and coloured glazed bricks and "Imperial" porcelain kitchen and scullery sinks. Other large exhibitors in these classes

were Mr. George Jennings (Lambeth Palace-road), who was awarded a medal, and Messrs. J. Tylor & Sons (Newgate-street) who showed in addition Walker's patent sand washer for washing sand from filter-beds, a hospital bath on wheels, and other sanitary appliances for hospitals and public institutions.

Many were the forms of filter shown, and the apparatus for the purification and the treatment of sewage. Shone's Hydro-Pneumatic Ejector was exhibited by Messrs. Hughes & Lancaster, and models of sewage precipitation tank and filtering-beds, by Mr. Thos. Cosham (Newark). The sewage filtering and purification systems of the International Water and Sewage Purification Company (Victoria-street, London), by polarite, by the Magnetite Patent Filter Company (Liverpool), by means of magnetite, and by the Sewage and Effluent Water Filtration Company (Birmingham), by the Lowcock method, were amongst the most important of this class of exhibits. The two last-named systems were in daily operation at the exhibition, purifying sewage supplied daily from the Liverpool sewers. The Birmingham Company had a sectional model working in combination with a precipitation-tank on the Dortmund principle. After chemical treatment and precipitation in the Dortmund tank the effluent was passed through the filter, air being forced through at the same time by means of a Root's blower, driven by electricity. The inventor explained the *rationale* of the system before the Engineering Section of the Congress.

The magnetite system, which is the newer, was so far approved by the judges that they awarded to this filter a certificate in the first list of awards. It also had the advantage of being explained before the engineering section by a sanitary inspector, Mr. W. Darley, F.S.I., of Basford, Nottingham.

According to Mr. Darley, magnetite is more effective than other known substances in removing acetate of lead, sulphate of copper, or permanganate of copper from water which contains them in solution.

The Palatine Engineering Company (Liverpool) showed a hydrant, a fire-valve, and a tap, all inventions by Lord Kelvin (the tap being now well-known); Messrs. Deakin & Co. (Birmingham) a sewer-gas destructor, in which the ordinary street-lamp and its burner are said to do the triple work of extracting, lighting, and burning up the gases from the sewers beneath. The Drill Hall in which the exhibition was held was ventilated by electric fans shown by Messrs. J. H. Pickup & Co., of Bury, who received a medal, and the Blackman Ventilating Company, which also obtained a medal, exhibited exhaust-fans driven by electricity, by steam, and by water power.

#### THE SANITARY INSPECTORS' ASSOCIATION.

UNDER the auspices of this Association a course of lectures and demonstrations for sanitary officers was opened on Monday, at St. James's Hall, Piccadilly, Professor Vivian B. Lewes, F.C.S., F.I.C., delivering the first of a series of five lectures on "Combustion, and the Influence of its Products on Health."

Sir B. W. Richardson, M.D., LL.D., F.R.S., the President of the Association, occupied the chair, and briefly introduced the lecturer. In the course of his observations he expressed his willingness to assist in the provision of some award in connection with the examination which it was proposed should take place upon the lectures to be delivered.

The Lecturer remarked at the outset, that from the very earliest days combustion had been looked upon as one of the most important phenomena of nature. The old thinkers came to look upon it almost as a deity, and in very much that frame of mind combustion was approached until some two centuries ago. Then, as men's minds broadened many experiments were made to find out the true process of combustion, and what combustion really was. At the end of the seventeenth century a wonderful old philosopher, Becher, brought forward a theory which took a great hold of the minds of thinkers of the day, and a few years after his death, Stahl, physician to the King of Prussia, studied the question and propounded one of the first chemical theories we ever had. Looking at all the processes of combustion, and taking them in the aggregate, he came to the conclusion that every combustible subject really consisted of two parts, one which escaped while the burning was going on and gave the phenomena of burning, and one which remained behind and was really the product

of combustion. This was called the phlogistic theory, and although it was afterwards shown to be absolutely wrong, it did more perhaps to bring about a true understanding and working of science than any theory that was ever put forward, simply because it was the starting point of order in scientific work. Towards the end of last century—some eighty years after Stahl first brought forward this idea—there came one of those marvellous waves of scientific thought over the whole of Europe which was experienced every few centuries, and left an indelible mark on the history of the countries. Lavoisier, a French philosopher with a marvellous power of collecting facts and producing theories from those facts, was able, with the assistance of men like Priestly and Cavendish, in England, a young doctor named Black in Scotland, and an apothecary named Scheele in Sweden, to tabulate not only the true theory of combustion, but also to give us other theories which put science on the true lines which it had followed ever since. With the aid of some interesting chemical experiments, Professor Lewes explained several of the discoveries made by Lavoisier. Black, he said, had dealt in a paper with the importance of studying not only what might be termed qualitative actions, but also quantitative results, and Lavoisier, seeing the importance of quantitative changes, was led to question the correctness of Stahl's theory, and at once propounded the idea that combustion must be not a giving off of the mysterious substance "phlogiston," but a taking into partnership of something else, during the process of combustion. As he went on with his labours Lavoisier found that the atmosphere was not an element, but really consisted of more than one gas, and his estimate that the atmosphere consisted in volume of one part of oxygen to four parts of nitrogen had proved to be practically correct. Afterwards oxygen came to be looked upon by Lavoisier not only as a vital principle, but also as the great supporter of combustion. The lecturer stated that if Lavoisier had gone further he would have been more astonished at the results he would have obtained, because he would have found that substances which were not looked upon generally as combustibles would burn with the greatest readiness by the aid of oxygen.

He proceeded to give several examples of the great and marvellous power of this gas in urging on combustion, and he said these experiments showed that during all processes of combustion they had a substance, a combustible which, having an affinity for the oxygen which was present in the air, combined with that oxygen, and in its combination developed a heat which we knew as the heat of combustion. In putting forward that theory, Lavoisier put forward the true theory of combustion which had come down to us, and only required a slight amount of modification, and that was that the terms "combustible" and "supporter of combustion" were absolutely and purely relative, for a substance which under one condition was combustible, might under another condition become a supporter of combustion. To illustrate this the professor caused a quantity of coal-gas to burn in the pure air, and some pure air to burn in a quantity of coal-gas. In further remarks he explained how in the atmosphere the otherwise too active properties of oxygen were kept in check by that gas being mingled with nitrogen.

Professor Lewes' second lecture will be delivered on October 22.

**BUILDING OPERATIONS IN GLASGOW.**—An interesting statement was made by Sir James King with regard to the progress of building in Glasgow at a meeting of the Dean of Guild Court there last week. He remarked that it was eighteen years since he last passed in review the work of the Court. The *Scotsman* reports that the total value of the work passed in the years 1874-75 was 1,826,150*l.*, while in 1875-76 it rose to 2,125,249*l.* That was followed by a period of severe depression. The greatest increase since then had been during the last two years. In the year ending August 31, 1893, the total value of the work authorised by the Court was 2,320,680*l.*, while in the year ending August 31, 1894, it was 1,275,445*l.* During the past year the houses erected were:—One room, 470; two rooms, 1,519; three rooms, 874; four rooms, 369; five rooms, 89; six rooms and upwards, 145—total number of houses, 3,466. The number of shops erected was 123, and the total estimated cost of the houses and shops was 785,950*l.*; alterations and additions, 241,207*l.*; and public buildings and warehouses, 248,185*l.* In addition, 21 new streets had been made. The total number of linings passed was 623—an average of 25 at each Court. The number of new houses erected in 1894 was in excess of any year since 1876.



## Illustrations.

### ST. JOHN'S CRYPT, CLERKENWELL, E.C.

**T**HIS fine crypt is practically all that remains of the Medieval Church of the Priory of Knight Hospitallers of St. John of Jerusalem at Clerkenwell. It was the chief home of the order in England, and its Prior ranked as first Baron of England.

Until a few weeks ago its architectural beauties were quite hidden, the side aisles and transept being filled with the human remains of parishioners of the present and last centuries, and the floor of the nave covered with a mass of earth almost 2 ft. in thickness in which interments had also been made. Owing to the dreadfully insanitary state of the crypt an Order in Council was made for the removal of the remains to Woking Cemetery, which has just been complied with, and a beautiful and interesting piece of Gothic London is recovered.

The crypt now consists of a nave of five bays, a transept at the extreme east end, and two aisles, that on the south having two finely-vaulted bays. The north aisle is formed by two chambers with plain barrel vaults, and entered by a doorway out of the north transept. The three western bays of the nave are Early Norman, round-arched in character, and must have formed a small church before the Knights of St. John came to Clerkenwell, about the year 1100 A.D. The two eastern bays of the nave, together with the transepts and south aisle, have pointed-arched groining springing from triple-clustered columns of Transitional character. This portion appears to have been built to sustain the choir of the Priory Church, which was erected above it, and consecrated in the year 1185 A.D. by Heraclius, Patriarch of Jerusalem, who also consecrated the Temple Church, in which he was buried.

Much of the original colour-decoration still remains on the arches of the nave; it is a simple ornament of half-circles in a red pigment, and a chevron design in thin raised plaster running along the ribs of the groins. Round the earlier portions of the nave is a stone bench, forming a seat, and at the western end one jamb of the original doorway can be seen, with three steps leading down to the floor; this would appear to have been the original difference of level between the ground outside and inside, although now it is considerably below the outside level. It was originally lighted by small narrow shaped windows in each bay, and some of the iron stays and bars are still in their place; and iron rings, from which the means of artificial lighting was probably hung, remain in the centre of the arches.

It was this crypt which was visited in 1762 by Dr. Johnson and other gentlemen, during the excitement about the famous "Cock-lane Ghost," which had promised to knock on the coffin of "Miss Fanny."

W. M.

### DESIGN FOR NEW HOUSES OF PARLIAMENT, TOKIO, JAPAN.

The selection by the Japanese of German architects for all their new public buildings seems at first sight rather surprising. That this Europeanising nation should have been so ready to adopt ideas from the German army and the English navy is natural enough, but one would have expected that if they wished to Europeanise their architecture they would have gone to Paris rather than to Berlin. If we are rightly informed, however, the question was settled on considerations of diplomacy rather than of art, and there were political motives for the importation of German architects.

On April 15, 1893, we illustrated the new Law Courts at Tokio, showing both the design carried out and the one originally intended, which varied in accordance with the special tastes of political parties, who, on the one side, wished to imitate Western architecture entirely, and, on the other, were satisfied with appropriate adaptations. In the present number we publish a plan and a perspective of the design for the new Houses of Parliament which are being erected at the same place. The plan is being carried out on the lines here shown, but we understand that the architectural design is likely to be somewhat modified in adaptation to its surroundings. This, we suppose, means that the design will be given that curious dressing which we will term a Japo-Italian Renaissance, a good idea of which was given in one of our plates of the above-mentioned Law Courts. The architects, Messrs. Ende & Boeckmann, of Berlin, at first had a large staff of assistants at Tokio; these have now been paid off, and the

firm has received due intimation that the designs purchased would be amended and carried out under native supervision, only one of the German staff remaining on the spot to act as adviser. One is naturally curious to see the result of this experiment.

The design we illustrate practically shows a block which would serve the purposes of any European legislative body with a large "Upper" and "Lower" House. As in the case of Professor Steindl's Budapest Houses of Parliament (see *Builder*, August 25) the architect's programme required the two houses to be treated as if of identical importance. Though there is a considerable difference in the number of seats in the council chambers of the Lords and Commons, their dimensions were to be the same, and both halls were to be equally conspicuous from without. Each house was to have a spacious *salle des pas perdus*, and there was to be a large central hall with a grand staircase for ceremonial purposes.

The plan, which explains itself, is certainly free from all complications, and the Lords' and Commons' wings, which are on either side of the central hall, are exact *fac-similes*. The main floor of the building is only a few steps above the road-level, and on passing the porter's boxes the visitor at once finds himself in the central hall. In front of him is the grand staircase which leads to the committee-room floor. On either side there are the *salles des pas perdus*, which, together with the cupola, form a most imposing *ensemble*. The total length of the combined *salles* is 100 metres, and the cupola has a diameter of 20 metres. Both chambers measure about 30 by 20 metres, exclusive of the gallery accommodation, which is in loggias outside the actual area of the floor. There is ample passage-room, and each chamber has a large library and dining-room. At the farther end of each wing are the Speaker's offices, Minister's studies, and the press rooms. Two stairs in each case lead to a separate business entrance on the basement level, and at the same time facilitate communication with the upper floor. Off a long passage at the back there is a row of offices, most of which are used for committee purposes.

The upper floor, as already implied, is practically entirely devoted to committee-rooms, the dimensions of which vary from 5 by 7 metres to 10 by 22 metres. At the head of the grand staircase there is, however, also a reception-room for the Mikado. The loggias to the chambers have their approach from this floor, and the press has a number of rooms. The loggias have their own staircases for public use, and there are some service staircases besides. As regards the basement, this part of the building is only used for offices.

As to the architecture, it also practically explains itself. The so-called "Italian" Renaissance style of the Berlin school has been adopted, and there is a severe columnar treatment. The whole feeling is essentially German and academical, the dome alone (which we hope is "earthquake-proof") showing some originality. The materials to be used will be native fire-stone, as far as possible. A number of Japanese workmen have been in Europe learning the different trades, especially masons' work.

The House of Parliament is only one of the numerous blocks which Messrs. Ende & Boeckmann designed for the Mikado's Government. Besides the Imperial Law Courts, which we illustrated, the most important of these are the Ministry of Justice, the Admiralty Office, and the Japanese "Scotland Yard." Both partners of the firm alternately visited Tokio, and Herr Boeckmann has very ably described his adventures and the difficulties encountered in the form of a "diary," published for private circulation. The late Herr Köhler and Herr Hartung were the chief assistants in charge of the work. Herr Seel, Messrs. Ende & Boeckmann's clerk of works, remained in Japan to act as adviser.

The Legislative bodies were first temporarily housed in a miniature wooden block erected from the same plans. This was burnt down in 1891, and then re-erected.

### ENDALLS MANOR, WARGRAVE-ON-THAMES.

THE illustration shows the entrance-front to a house recently erected at Wargrave-on-Thames, Berkshire.

The entrance-porch and upper floors are in half-timber work and tile-hanging, all the timber-work being in oak. The remainder is in red brick and stone dressings. The tower has an extensive look-out, and contains the cisterns in the upper part.

The contractors were Messrs. J. Bottrill &

Sons, of Reading. Mr. John Belcher is the architect.

### THE GREAT HALL AND STAIRCASE, HURSTBOURNE, HANTS.

WE illustrate this week interior views of the Great Hall and Staircase of this Mansion, exterior views of which we published in our issues of November 11, 1893, and January 27, 1894.

It is proposed to execute the whole of the woodwork in oak, and to adapt certain old paneling, which has been acquired by Lord Portsmouth, for lining the walls.

The ribs and pendants of the ceiling will also be of oak, the spaces between the ribs, as well as the soffits of stairs, being filled with heraldic and other devices in *carion pierre*.

As before stated, the majority of the work is being executed by Lord Portsmouth's own workmen on the spot.

### THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

**Paddington Sewers.**—With reference to an application from the Vestry of Paddington for the loan of 20,000l. on the annuity system, for twenty years, for special sewer works, the Finance Committee reported that:—

"Towards the end of the year 1890 the Vestry of Paddington invited tenders at a schedule rate for the execution of special works and repairs to a large number of old sewers in the district. The works consisted chiefly of the construction of new inverts to old sewers, and up to December, 1893, seventy-two sewers had been partly reconstructed at a cost of 20,882l. 14s. 6d., which has been paid for out of current rates. The vestry now desires to construct about 26,663 ft. run of new inverts to eighty-six old sewers, and to execute some slight repairs and pointing to a length of 8,993 ft. of sewer at an estimated cost of about 21,997l. and 697l., making together 22,694l. It is a serious question (as it would form a precedent) whether the vestry should be allowed to borrow money for works of maintenance and repair to existing sewers, the expenditure for which should be, and, as far as we are aware, always has been, defrayed out of rate."

The report, however, after the statement of some facts bearing on the subject, concluded with the recommendation that:—

"For the sake of the public health the request of the vestry for a loan to carry out at once the remainder of the works should be acceded to, but that the period for repayment should be limited to five years, that being about the time by which the works would have been completed under the resolution of the vestry to expend 5,000l. per annum upon these special works."

A recommendation in accordance with the report was agreed to.

**Battersea Public Baths.**—On the recommendation of the Finance Committee, an application by the Commissioners for Public Baths and Wash-houses for the Parish of Battersea, for a loan of 5,000l. to defray the cost of constructing an additional swimming-bath and other works, was granted, on condition that interest at the rate of 3l. 10s. per cent. per annum be paid quarterly, and that the principal be repaid by equal annual instalments within a period of thirty years.

**Plans of Improvement Schemes.**—The General Purposes Committee recommended, and the Council agreed, that the following be a standing order of the Council:—

"Whenever a committee resolves to bring up to the Council a scheme involving the acquisition of land at a cost exceeding 1,000l., a cartoon plan of the scheme shall be prepared in the proper department and hung in the Council chamber."

**Cleaning Gullies of Main Sewers.**—The Main Drainage Committee made the following report:—

"Under Section 16 of the Council's General Powers Act, 1894, the duty of cleansing every grating and gully in main sewers, with any sewer of the Council (except in streets vested in and cleansed by the Council) so far as such grating or gully belongs to or is under the control of the Council, shall as from the passing of the Act be transferred to the vestry of the parish or the board of works for the district within which the same is situated. Hitherto the gullies connected with the main sewers on the north side of the Thames have been under the control of the Council, and the Council has undertaken the cleansing and removal of the slop from them. On the south side of the Thames all gullies connected with the main sewers have, in accordance with an arrangement made about twenty-five years ago, been under the control of the local authorities, and cleansed and repaired by them. We recommend—That the local authorities of the districts on the north side in which there are gullies connected with the main sewers be informed that after the end of this year the Council will cease to undertake the cleansing of them, and that the duty will from that time devolve upon the local authorities, as provided by Section 16 of the Council's General Powers Act, 1894."

The recommendation was agreed to.

**Tower Bridge (Southern Approach) Bill.**—The Parliamentary Committee recommended:—

"That it be referred to the Parliamentary and Improvement Committees to consider and report to the Council







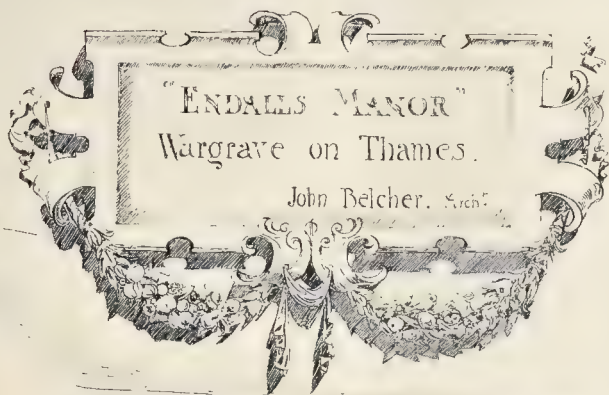
Royal Academy Exhibition, 1894

















THE BUILDER, OCTOBER 13, 1894.

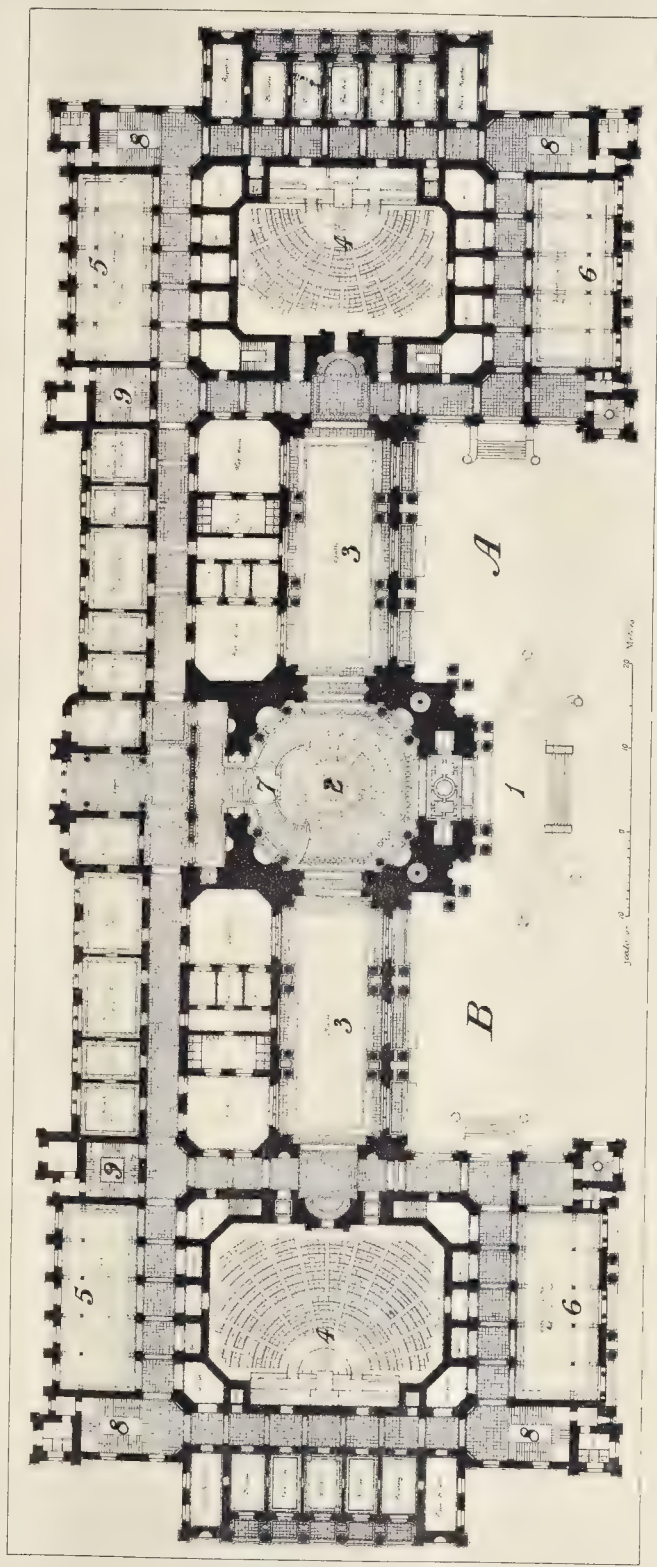


PERSPECTIVE VIEW.





LONGITUDINAL SECTION.



PLAN OF PRINCIPAL FLOOR.

- |   |  |
|---|--|
| <p>A.—House of Lords.<br/>B.—House of Commons.<br/>1.—Main Entrance.<br/>2.—Central Hall.<br/>3.—Salles des Pas Perdues.<br/>4.—Council Chambers.<br/>5.—Libraries.<br/>6.—Refreshment Rooms.</p> | <p>7.—Grand Staircase.<br/>8.—Public Galleries.<br/>9.—Staircases to Public Galleries.</p> |
|---|--|

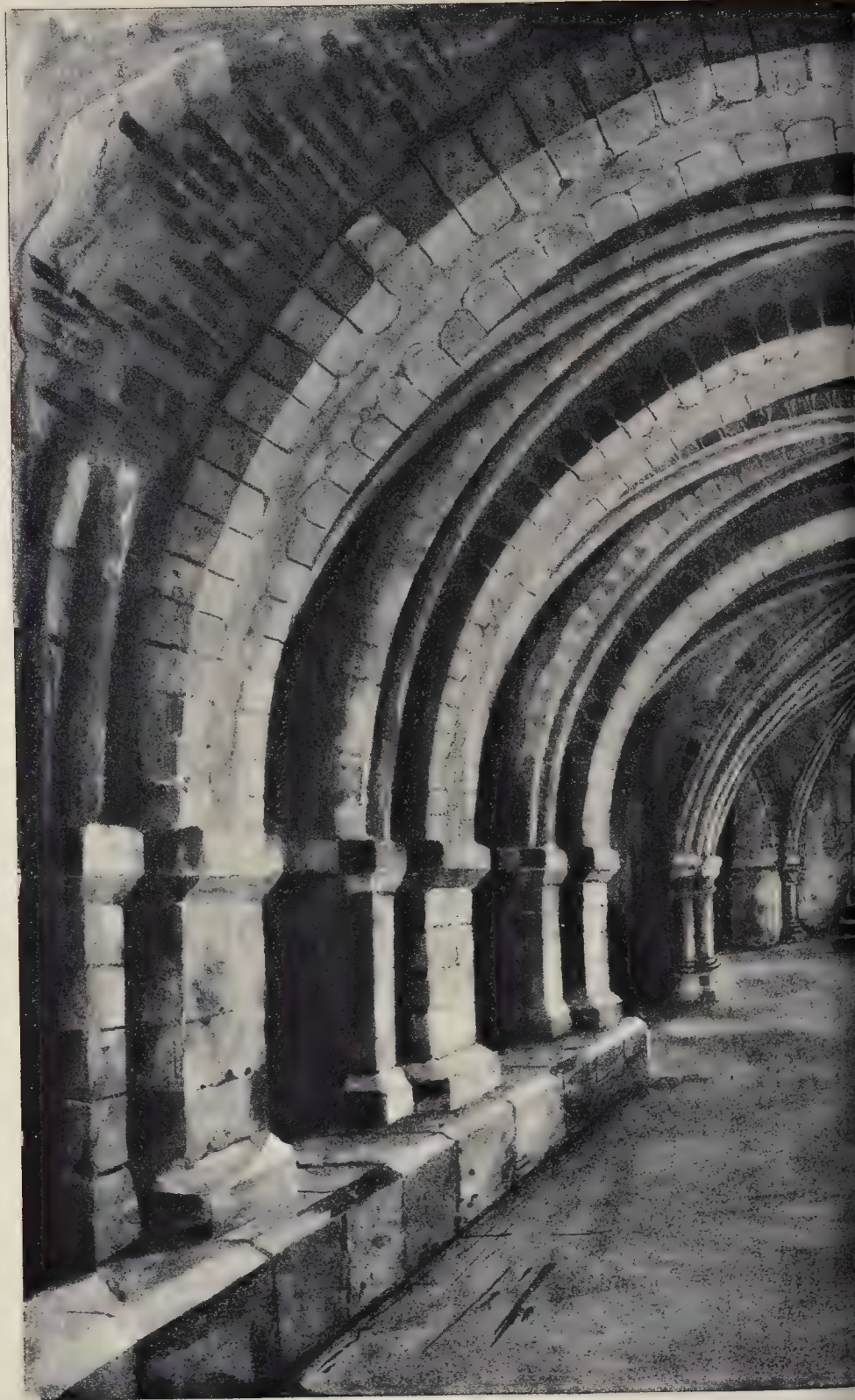
THE NEW JAPANESE HOUSES OF PARLIAMENT, TOKIO MESSRS ENDE & BORTSMANN, OF BERLIN, ARCHITECTS.

THE PHOTO SPRAUKE & CO. 48 EAST-HANDING STREET LONDON E.C.4









CRYPT, ST JOHN'S, CLERKENWELL





NO. PHOTO SPRAGUE & C. 18 EAST WARDEN, STREET FETTER, AND S.

RED) —FROM A DRAWING BY MR. W. MONK.





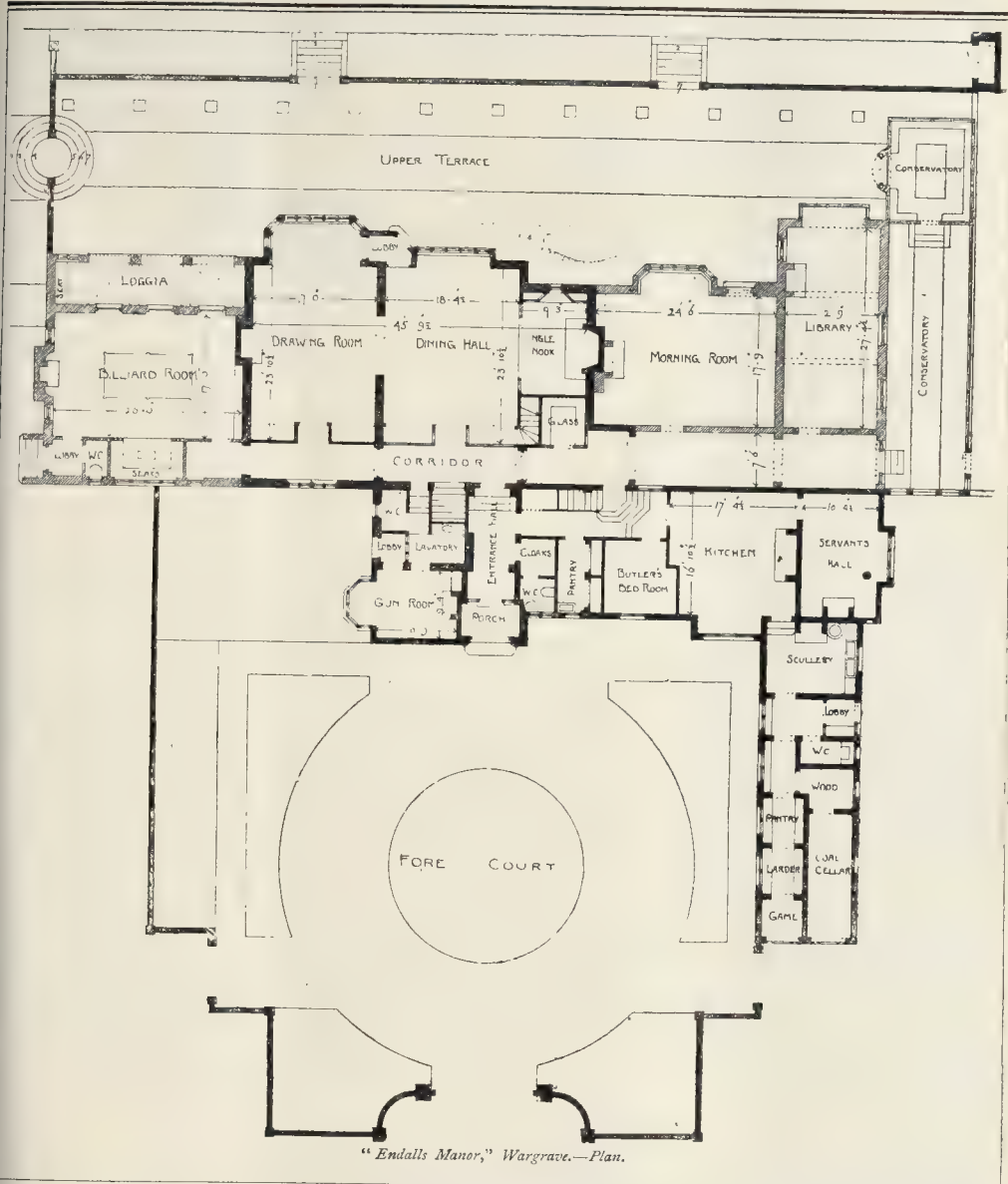


STAIRCASE, "HURSTBOURNE," HANTS.—MESSRS. BEESTON & BURMESTER, ARCHITECTS.

Academy Exhibition, 1894







"Endalls Manor," Wargrave.—Plan.

what further steps they deem it advisable that the Council should take in connexion with the Tower Bridge (Southern Approach) Bill."

In their report the committee stated that:—

"It is of the greatest importance to obtain a decision of the House of Commons as to whether or not all future schemes involving 'betterment' are to be subjected to the condition as to compulsory purchase, or indeed to any of the conditions imposed by the Select Committee of the House of Lords, and in our opinion the only method whereby such a decision can be obtained will be for the Council to bring in again precisely the same bill in the form in which it has left the House of Commons. We understand that it has been suggested that some other route or routes might be preferable to that adopted by the Council. So far as these other routes have been specified, we are advised that the construction of them would be far more expensive than the Council's proposal, and not of greater utility. But apart from this consideration we must point out that any proposal involving a new route would require lengthy consideration by the Council and its Committees, and great labour by its officers in the preparation of plans and estimates, so that it would be most difficult to put before Parliament in the ensuing session any properly matured scheme. . . . We think that it would be well if the Council would refer to the Improvements Committee and ourselves to report jointly thereon."

Mr. Antrobus moved as an amendment that the following words be added to the report:—

"The Council regrets that under all the circumstances

of the case, the Parliamentary Committee did not carry through the Bill under the proposal of the Select Committee of the House of Lords."

Mr. Reed seconded the amendment, which, on a division, was rejected by 63 votes to 26.

Mr. Howell Williams proposed that the inquiry should also include the question of route.

This proposition was accepted, and the recommendation was then agreed to.

**Boundary Street Improvement Scheme.**—The Public Health and Housing Committee, in submitting the working drawings, specifications, quantities, and estimate for the foundations of the buildings proposed to be erected on Section B of the area comprised in the Boundary-street improvement scheme, reported that they had carefully considered the question of the cost of the superstructure, having regard to the Council's resolution of 21st March, 1893, requiring a return of 3 per cent. on building operations of this nature, and were satisfied that this resolution would be complied with. The estimated cost of the foundations was 6,210*l*. The Committee were of opinion that the work should be executed by the Works Department.

It was resolved:—

"That, subject to an estimate to be submitted to the Council by the Finance Committee as required by the statute, the working drawings, specification, bills of quantities and estimate for the foundations of the buildings to be erected on section B of the area comprised in the Boundary-street improvement scheme be approved, and be referred to the Works Committee."

**Water Companies' Regulations.**—The Public Health and Housing Committee reported that in accordance with the resolution of the Council of January 30 last, they addressed communications to the London water companies in February, asking them to make the following alterations in the regulations made under the Metropolis Water Act, 1871, viz.:—

(a) To amend regulation No. 21 so as to read as follows:—

"Every water-closet cistern or water-closet service box hereafter fitted or fixed in which water supplied by the company is to be used shall have an efficient waste-preventing apparatus, so constructed as not to be capable of discharging more than three gallons of water at each flush."

(b) To amend the regulations so that the requirements as to the supply of water to water-closets shall apply equally to the supply of water to sinks used for receiving any solid or liquid filth.

(c) To make a regulation which will prevent cisterns

being brought into use for supplying water for domestic purposes, or for food for beasts, so long as they directly supply any water-closet or sink used for receiving any solid or liquid filth.

(d) To make a regulation requiring that in all cases where any premises have a constant water service, one or more taps shall be provided in connexion with the rising main for the supply of water for drinking purposes.

On the 16th of April a reply was received from Messrs. Hollams, Sons, Coward, and Hawkesley on behalf of the seven associated metropolitan water companies, stating that the suggested regulation (a) as drafted in the Council's letter, which would increase the authorized flush of water from two to three gallons raised a question of general public importance, for it would cause an enormous addition to the consumption of water and entail increased expenditure, the public as regards the requirements of future supply.

The companies desired to point out that the regulations made under the Act of 1871 were framed after full inquiry, and were based on the evidence of very competent witnesses who considered two gallons amply sufficient. In the opinion of the companies the adequacy of the flush for sanitary purposes depended on the construction of the apparatus, the head or pressure under which the water was discharged, the size of the down-pipe "between the flushing apparatus and the basin of the closet, and the construction and shape of the close-basin, rather than on the actual quantity of water discharged." In conclusion it was stated that the companies confidently anticipated being able to demonstrate that a two-gallon flush was abundantly sufficient, and that no advantage whatever would result from a greater consumption of water.

As regards the other matters referred to, Messrs. Hollams expressed the desire of the companies to occur in any regulations which might be reasonably required for sanitary purposes without involving consumption of water for useless objects.

After giving some further particulars as to correspondence with the water companies, the report concluded:—

"In our report presented to the Council on December 5 last we expressed our reasons, arrived at after very careful inquiry, for considering that water-closet users should be capable of discharging a 3-gallon flush, and our subsequent correspondence with the water companies has not in any way affected our opinion on this point. We may add that since we last reported to the Council on this subject several further letters have been received from London sanitary authorities urging the desirability of a flush of at least 3 gallons. More than six months have now elapsed since formal application was made to the London water companies for the alteration of their regulations; and in view of their refusal to make the most important alteration suggested, viz., that relating to the capacity of flushing cisterns, and of the fact that they have not intimated their intention to alter the regulations in the other points suggested or taken any steps to do so, we think that the Council should now ask the Local Government Board to proceed in the manner directed in section 19 of the Metropolitan Water Act, 1871. Under the powers given by that section, if any company on being requested in writing by the Council to repeal or alter any of the regulations for the time being in force, or to make new regulations instead of any of the same, refuses to do so, the Local Government Board may, if they think fit, appoint a competent and impartial person of engineering knowledge and experience to report to them on the subject, and on the report of such person the Board may make such regulation, repeal, or alteration, as they think proper. We therefore recommend:—That a letter be addressed to the Local Government Board, communicating the purport of the correspondence between the Council and the London water companies as regards the suggested alteration of the regulations made under the Metropolitan Water Act, 1871, and asking the Board now to appoint a person of engineering knowledge and experience to report to them on the subject as provided for in section 19 of the Act."

The recommendation was adopted.

After the transaction of other business the Council adjourned.

APPOINTMENT.—We learn that Mr. Nowell Parr, deputy engineer of the borough of Walsall, has been elected surveyor to the Brentford Local Board, in place of Mr. J. H. Strachan.

## Correspondence.

To the Editor of THE BUILDER.

### THE R.I.B.A. EXAMINATIONS.

SIR,—I venture to think that there are legitimate grounds of complaint as to the manner in which the instructions to students for the R.I.B.A. Examinations are drawn and issued. This has forcibly been brought home to me in supervising the work of a student preparing for the Examination.

Firstly.—Would it not be possible to express the first and third instructions in the Art Section in less ambiguous terms, so that a person of ordinary intelligence could readily understand them?

Secondly.—Could it not be made clear what the "concise description" refers to? This instruction occurs immediately after those of the Art Section, and contains the words "building or buildings," and leaves one in a state of pleasing uncertainty as to whether it refers to the whole of the Art Section or the Gothic portion only.

Thirdly.—Why does the second regulation contained in the Science Section differ so materially in the calendar for 1893-4, and the paper of Instructions printed on February 11, 1894? This paper does not appear to have been issued voluntarily to probationers, and what happens when a student, like the one named above, adheres to the calendar, and upon writing for his application form a few days before the date for sending in his drawings, receives a paper requiring a totally different sheet to the one he has done?

And further, when a puzzled student writes for an explanation on these points, it is very hard to receive an answer that the instructions are clear and explicit and must be adhered to.

A.R.I.B.A.

### CHILTERNHAM COLLEGE NEW CHAPEL.

SIR,—May I add a line to the notice which appeared in last week's *Builder* of the bosses in the new chapel, and came out while I was away for a holiday in Italy?

In such designs the credit rests largely with the actual carver.

Mr. R. L. Clarke, working under Mr. Martyn, from rough sketches and instructions of mine, is more really the designer of the bosses than I am.

HENRY PROTHERO.

P.S.—By-the-by, the subject of No. 7 is the Nativity.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XV.

STORAGE OF WATER (continued).

**T**HE overflow or waste weir is placed at the embankment end of the reservoir on solid ground, with a concrete foundation. It consists of a heavy masonry base formed of large stones set in cement and well keyed together, with heavy pitching on the approach and discharge sides. The channel on the discharge side is continued in a series of steps down the side of the embankment (figs. 30 and 31) (the watercourse being pitched with stone), and terminates in another reservoir, or in the original

stream-course of the valley clear of the embankment. The purpose of the overflow-weir is to prevent the water in the reservoir from rising above the level of the embankment and flowing over, and, in the case of earthen structures, causing the inevitable destruction of the works. In practice the length of weir is made from 2½ ft. to 4 ft. per 100 acres of watershed. The length is limited by the maximum height to which the water is allowed to rise above the crest of the weir, which should never exceed 2 ft., and is generally fixed at 18 in. The conditions peculiar to each gathering-ground must be taken into consideration in the design of such works, but the rules given above may be safely followed where no storm records are available. An instance of insufficient length of weir in connexion with the Tittesworth reservoir of the Potteries waterworks occurred in 1862. In this case the drainage area was 6,800 acres, and the waste-weir was 60 ft. in length. The water in the reservoir rose 5 ft. above the crest of the weir and to within 1 ft. of the top of the embankment. Where a bye-wash channel has been constructed round the margin of the reservoir, from the inlet, of sufficient capacity, the length of the overflow weir may be reduced accordingly. A residuum pond is frequently constructed at the inlet end of a storage reservoir with considerable advantage. This has the effect of reducing the velocity of the storm waters, arresting any detritus, and allowing the water to deposit the greater portion of the matter held in suspension. The last is a matter of some importance where the storm waters are exceedingly turbid.

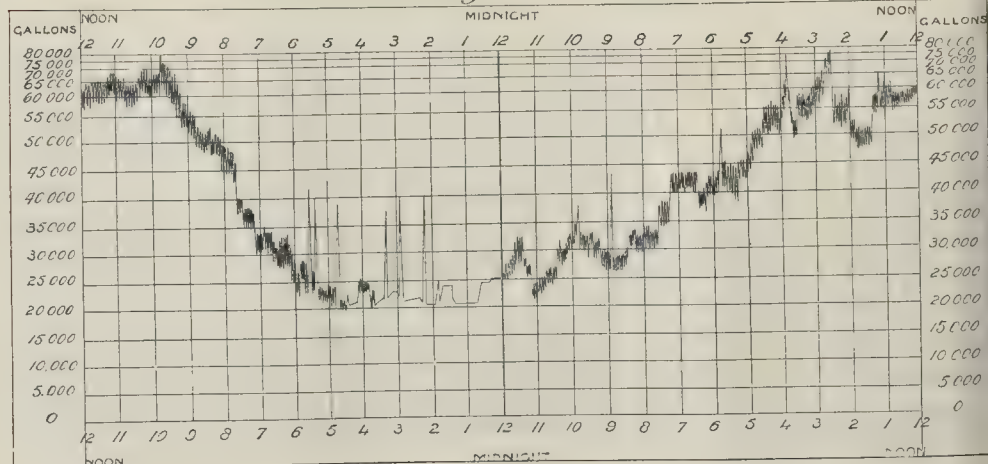
The pond is formed by constructing a wall or embankment across the mouth of the inlet, the top level of which being about 12 in. above the high-water level of the reservoir. In the case of an embankment it is necessary to face the top and slopes with heavy stone pitching or concrete. The inlet water is allowed to rise over the top of the residuum wall (which forms one long weir), and fall into the storage reservoir. The pond may be cleansed either by drawing off the water and removing the deposit by manual labour, or by means of pipes connected with the outlet and continued through the reservoir to its outlet, delivering a continuous stream of sludge water into the original river channel below the embankment.

The design and construction of masonry or concrete dams, being rarely necessary for rural supplies, do not come within the scope of these papers.

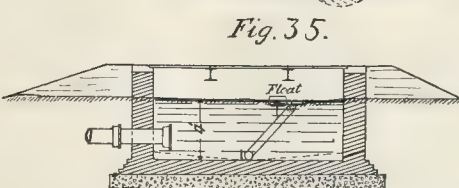
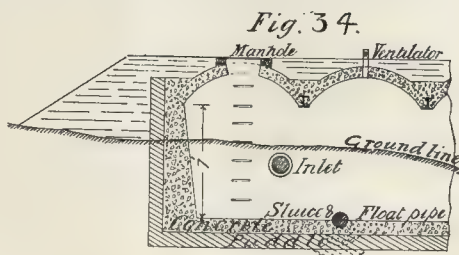
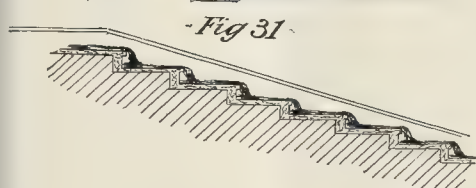
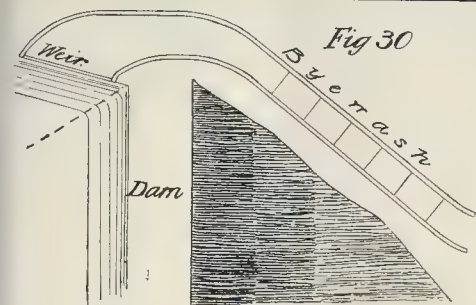
The cost of storage reservoirs with earthen embankments varies considerably, according to circumstances, from 70s. to 900s. per million gallons of capacity.

Service reservoirs are supplied direct from the impounding reservoir, or, where filtration is necessary, from the filter-beds. Their office is to regulate the variation in the daily consumption and to provide sufficient storage to meet the requirements of supply in the event of accident of a temporary nature occurring between them and the source. The quantity of storage to be provided varies according to circumstance, but, as a rule, two days' storage will meet emergencies. Where the source of supply is at considerable distance, or somewhat inaccessible

Fig. 32.







and where there is a single main, or, in the case of a pumping supply, where there are no duplicate arrangements, it would be prudent to increase the storage capacity of the reservoir so as to make provision in the event of a break-down.

In order to enable the student to form an idea as to the variation during the day, the accompanying diagram (fig. 32), is given, which is taken from a Deacon Differentiating Meter. This diagram shows graphically the daily variation in a manufacturing town of 48,258 inhabitants, and may be taken as a fair example. The abrupt rises and falls shown on it between 2 and 6 a.m. are due to the supply to locomotives during those hours, 20,300 gals. per hour, which is chiefly due to defective fittings. The total consumption, including domestic and trade supply, per head of population is equal to 19.85 gals., and the minimum flow 10.09 gals. per head, or practically one-half of the supply.

The variations of supply during the different periods of the year are not so great as might be anticipated. The householder's favourite practice of allowing the taps to run during frosty weather and the number of burst pipes have the effect of raising the consumption in the town referred to frequently up to, and in excess of, the summer months. The following table gives the consumption per head per day for the last four years:—

MONTH.	1890.	1891.	1892.	1893.
January .....	19.77	20.30	23.56	28.50
February .....	19.57	23.26	21.24	23.43
March .....	20.38	21.54	22.33	22.75
April .....	18.95	20.38	23.11	23.14
May .....	20.99	21.06	23.39	22.11
June .....	20.81	22.50	23.31	23.25
July .....	21.05	23.62	22.00	21.09
August .....	21.79	21.66	21.73	20.63
September .....	21.30	22.13	21.72	18.78
October .....	21.10	22.13	22.08	20.08
November .....	20.58	21.30	21.26	21.91
December .....	24.21	23.54	23.39	19.90

The site for a service reservoir should be at a sufficient elevation, and within the immediate vicinity of the district to be supplied. It is usually constructed either of masonry, brickwork, or concrete, and roofed over; or by excavation and embankments lined with concrete and pitching and left open. It is absolutely necessary to cover the service reservoir when near a town or manufacturing district to prevent contamination, and especially so after filtration. Service reservoirs which are not covered when situated at some distance from any smoke or fumes from chemical or other works, and in such cases the depth must not be less than

10 ft., which may be increased with advantage so as to prevent the growth of vegetable matter which produces that peculiar fish-like smell so common in shallow reservoirs. Figs. 33A and 33B are examples of open reservoirs, and fig. 34 of a covered reservoir. Covered reservoirs should always have at least 2 ft. of earth above the roof to keep the water as cool as possible, and ventilators should be fixed in the crowns of the arches. It is an advantage to have a wall dividing the tank or reservoir into two portions for the purpose of cleansing from time to time.

Collecting-tanks are used for storing the water from springs, and fulfil the offices of impounding reservoirs on a small scale, to which the duty of a service-tank is frequently added. These tanks are constructed of masonry, brickwork or concrete, either with arched roofs, as in fig. 34, or covered with iron plates supported by girders (fig. 35).

The cost of covered service reservoirs varies from 2*l.* to 6*l.*, and of open reservoirs from 1*l.* per 1,000 gallons.

The usual accessories to a service or collecting reservoir, containing from 5,000 gals. to 50,000 gals., are the inlet and outlet, overflow and wash-out or scour-pipes. The inlet-pipe should be so arranged that the inflowing water may be shut off or diverted from the reservoir when the latter is being repaired, &c. The mouth of the inlet-pipe is usually fixed slightly above the level of overflow. The outlet should be a few inches above the level of the floor of the reservoir, so as to allow for a certain amount of deposit from the water. Its mouth should be covered with a perforated cap, rose, or strainer, which is best constructed of tinned copper. The outlet should be commanded by a sluice-valve, fixed inside the reservoir, worked from above by a wheel and spindle. The supply from a reservoir is sometimes taken by means of a floating pipe (fig. 35). This ingenious method allows of the water being always taken from a little below the surface, which is the clearest portion of the water in a reservoir. The overflow pipe is either a pipe taken through the wall of the reservoir with its mouth at the highest point to which the water is to be allowed to rise, or it may consist of a vertical pipe carried through the floor of the reservoir, having a trumpet-mouth for receiving the overflow water. In the latter case the pipe should be constructed of copper. The wash-out, or scour-pipe, has its mouth situated at the lowest point of the floor of the reservoir, which should be made to slope towards it. It should be large enough to empty the reservoir rapidly, and must have its outlet below the level of the floor of the reservoir. It may either be

controlled by a sluice-valve worked from the surface, or in small tanks by means of a brass plug and chain. In small tanks the overflow and wash-out are sometimes combined, the foot of the vertical overflow pipe being ground into the mouth of the wash-out; by loosening and lifting the overflow pipe the water is free to escape through the wash-out. Iron steps should be built into the wall of the reservoir to allow of access to the interior.

The inner surface of the reservoir should be rendered with cement, which should be brought to a perfectly smooth surface with the trowel.

Where the supply is obtained from springs, it is usually necessary to collect them by means of stoneware pipes with open joints covered with broken stone. These pipes are connected by means of close-jointed pipes, and conveyed to a small tank, from whence they are conducted to the reservoir. Great care must be taken in collecting springs to avoid all chance of pollution.

#### TRADE CATALOGUES, &c.

MESSRS. HAYWARD BROS. & ECKSTEIN send a circular in regard to their "Safford" Radiators, for which they claim certain advantages in soundness of construction, especially as to jointing by the use of a patent screw-nipple, which draws the joints together tightly. Each loop of the radiator is tested to a pressure of 120 lbs. to the square inch, and the whole assemblage of loops when put together are again tested to the same pressure. If the framers of catalogues of this kind of practical article would dispense with the designs which they call "ornamental," they would do better for their own interests, in the eyes of architects at all events.—The General Iron Foundry Company send us their illustrated catalogue of lavatory stands (which would be far more attractive to people of taste if they were less bedizened with what is supposed to be "ornament"); baths, of which the same might be said, but which appear (the plainer ones) to be good baths at moderate prices; water-closet basins, including one which is called the "County Council Closet," and is fitted with a lead thimble for connexion with the lead pipe by a wiped joint; water-waste preventers, sinks, &c.—Messrs. Hobbs, Hart, & Co. send us their catalogue of safes and strong-room doors, which is very fully illustrated not only with ordinary advertisement representations but with constructional drawings showing the method of building in strong-rooms, and with complete descriptions of the construc-

Fig 33(a)

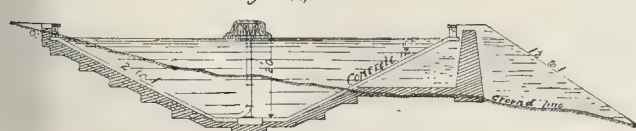
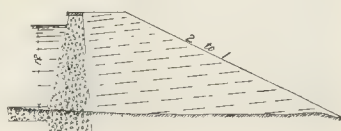


Fig 33(b)





HOSPITAL, OLD SWAN, NEAR LIVERPOOL.—On Saturday last, the recently-erected hospital for infectious diseases at Mill-lane, Old Swan, was



The main arcade to the central portion is of polished red Verona marble, the architrave and cornice over being treated with solid gilding, as also the capitals. The wall-surface of the two-story aisles is covered with stamped leather, the balustrading to the gallery-front being of bronze, the panels between every third pilaster being faced with an enamelled and coloured shield, representative of the counties of England. The lower aisle ceiling is divided into squares of decorated plaster, the upper being a semi-circular vault following the lines of the arcade, and intersected by the cross-arches. The detail throughout is in a style of Renaissance, which we have begun to associate with Mr. Colcutt's name. The lower side-aisles are raised two steps above the main floor level, and the fresh heated air is brought in through the risers of the steps, while steam coils are placed above the main cornice under the clerestory windows to prevent any down-draught of cold air. Besides the opening in the barrel ceiling, the clerestory windows will be opened for extra ventilation. The marble work of various beautiful colours, has been well executed by Messrs. Burke throughout the building, especially in some of the fireplaces. American walnut is used for doors and fittings generally, the flooring to the main hall being of oak in 3 in. widths, and laid on strips of india-rubber about  $\frac{1}{2}$  in. thick, for giving elasticity for dancing purposes. The construction is fireproof, cement being used for iron, coke breeze, and cement. The ceiling to the main hall is a very satisfactory piece of work, and has been painted by Messrs. Thrigley & Hunt. The second and third floors are to be used as masonic rooms, &c. This addition makes the Holborn Restaurant probably the largest and best fitted undertaking of its class in the world, and reflects credit not only on the public spirit of the proprietors, but also on the manner in which the designs of Mr. T. Colcutt have been carried out by the general contractors, Messrs. Holland & Hannen, and by the various sub-contractors who have been employed on the works.

#### SANITARY AND ENGINEERING NEWS.

**PROPOSED PIER, MORECAMBE.**—A public meeting was held at Morecambe on the 27th ult. with reference to the construction of a pier, when a number of Manchester financiers who were willing to take over the concession of the pier order, attended. A large sum of money were subscribed for the purpose. Mr. Littlewood, architect, explained the construction of the pier; he said it would be about 800 yds. in length and made of wood and iron, having a pavilion about 200 yds. from the promenade. The entrance would have an ornamental ticket office with gates and turnstiles. The pavilion would be approached by a covered way from the entrance on the western side, and would have seating capacity for about 1,200 people, or thereabouts. Internally it would be lighted from side windows, and in addition there would be a large dome in the centre; at each corner turrets would be placed. The iron piles to support the structure would be screwed down to a suitable foundation, the iron columns being tied together both ways with lattice girders. A platform would be situated at the extreme end, on which would be erected a band kiosk and seating accommodation for about 400 people. Shops would be built on each side of the pavilion, and shelters placed along the deck at intervals.

**BRACKNELL DRAINAGE.**—The Local Government Board has given sanction to a loan of £1,500 for the sewerage and sewage disposal of Bracknell. The sewage will be purified by irrigation on 22½ acres of land. There are to be two small pumping-stations worked by oil-engines. The engineer of the scheme is Mr. W. H. Radford, C.E., of Nottingham.

**PROPOSED SEWERAGE WORKS, LLANDUDNO.**—A Local Government Board enquiry was held at Llandudno last week, by Mr. Thomas Codrington, C.E., respecting an application by the Improvement Commissioners for permission to borrow £4,593½ for works of sewerage and sewerage extension. It was explained that the proposed scheme was an extension of that laid down in 1875, and was in consequence of the rapid growth of the town, and not, as had been thought, owing to the system at present adopted being at fault. The Commissioners' engineer, Mr. E. Paley Stephenson, gave details showing that the new outfall would be alongside the existing one, but 1½ ft. nearer the Great Orme's Head. There would be a pumping-station immediately at the west end of Abbey-road to raise the sewage from the existing sewer, and to pump it to the tide in case of flooding. It was intended to extend the present surface-water scheme and to separate the surface water from the sewage. But, although under the new system the sewage and surface water would be kept separate wherever possible, it would not be advisable to drain all the existing houses with reference to surface water. In his opinion, if that were done, the present sewer would not be adequate for the requirements of the town. The proposal engendered considerable opposition on the part of residents and property-owners in the neighbourhood of the suggested works, and others. On their behalf it was submitted that a pumping-station was not necessary, it would be costly, and that it would be a great

nuisance. The present system, it was stated, could be enlarged by duplicating the present outfall, and making the system separate throughout. The expense would be moderate, and the result entirely satisfactory. It would be prudent economy to spend 2,000£ in making the present system separate. The Town Commissioners replied that the scheme brought out under their auspices was believed to be the most practicable, and was so designed as to be the least nuisance to the majority of the inhabitants. The spot where the works were proposed to be carried out was a sparsely populated district. No witness for the opposition was a professional engineer. The inquiry then closed.

**ELECTRIC LIGHTING, WORCESTER.**—On Thursday last, the 11th inst., the new electric lighting works at Worcester were announced to be opened. They have cost between 45,000£ and 50,000£. The main features of the scheme are as follows:—The Corporation purchased an old mill at Powick, and, taking advantage of a 12-ft. fall in the river, erected a generating station. The water-power is developed by four inward-flow turbines of the Victor pattern, two 54-in., one 48-in., and one 30-in., the turbine-power being about 500 h.p. There is sufficient steam-plant to generate the whole of the electricity on the rare occasions when, through flood, or drought, there might be too much or too little water for the turbines to be used. Each of the four turbines is fitted with an automatic regulator, which, having been fixed at the required speed, increases the machinery to regulate its own speed by increasing or decreasing the water-flow. The steam plant can be used either in conjunction with or instead of the water-power. There are three vertical compound marine engines of 290 i.h.p. each. The turbines and engines are connected by cotton driving-ropes with four Mordey-Victoria alternators, each having a capacity of 125,000 watts, and absorbing about 200 h.p. The engine room is also fitted with a travelling-crane, capable of lifting up to twelve tons. In the boiler-house are four Babcock and Wilcox water-tube boilers, equal to 900 h.p., fed from the river by two duplex feed-pumps. The generating station, in which there is plenty of room for future extension of the plant, comprises also stores, offices, and engineer's quarters. The current is taken to Worcester by two pairs of copper mains at a pressure of 2,000 volts. These are tapped at St. John's, and a low-tension main supplies the current for house lighting in St. John's. The high-tension mains then continue to the central transformer station at All Hallows, whence go two circuits for street-lighting, which is at present confined to High-street, Broad-street, the Cross, St. Swithin-street, and Foregate-street. There are various sub-transformer stations throughout the area to be supplied. The Guildhall, Public Hall, and other public buildings and offices have been fitted up for lighting by electricity, and there has already been a considerable demand for private lighting. Mr. Preece has advised the Corporation throughout; the Brush Electrical Engineering Company, Limited, were the contractors for the machinery and electrical plant, and Messrs. Rowbottom for building the generating station.

**WATER SUPPLY DIFFICULTIES AT LEDBURY.**—The inhabitants of Ledbury, in Herefordshire, are very difficult to please in regard to their water supply. It appears that the present supply has been condemned by reason of its extreme hardness, and the Local Government Board has recently written to the Parochial Committee asking them what they are doing in the matter. But the Committee evidently are not masters of the situation. Their proposals have been overridden by a large body of ratepayers, who have just passed the following resolution:—"That the inhabitants of Ledbury, in public meeting assembled, taking into consideration the delay which has taken place on the part of the Parochial Committee in dealing with the question of the public water supply, most emphatically protest against any further expenditure of public money for this purpose by the Parochial Committee, and is of opinion that the whole question should be deferred and dealt with by the Urban Council about to be elected by the ratepayers within the district for which the water is required." The Local Sanitary Authority met the next day and meekly bowed to the exigencies of circumstances, so that the work will now have to be done by the Urban District Council when it is elected—a very convenient way of shelving the question for the time being.

#### STAINED GLASS AND DECORATION.

**WINDOW, EMMANUEL CHURCH, MANNAMAD, DEVON.**—A stained glass window has recently been placed in the north transept of this church. The figures selected for representation are "Hope" and "Patience." It is from the studio of Messrs. Fournere & Son.

**WINDOW, TORRINGTON CHURCH, DEVON.**—A stained glass window has just been inserted in the parish church of St. Michael, Torrington. It has four lights, and illustrates "The Return from Calvary." In the tracery are angels bearing symbols of our Lord's Passion. The work was executed by Messrs. Joseph Bell & Sons, of College-green, Bristol.

#### FOREIGN AND COLONIAL.

**FRANCE.**—M. Robert David d'Angers, son of the celebrated sculptor, has just presented to the Government a fine portrait of his father, painted by Hébert, formerly director of the French School at Rome. It has been placed in the council-room of the Ecole des Beaux-Arts.—M. Thomas, architect of the Palais des Archives, has had the figures on the facade (the "Four Seasons," "Prudence," and "Fame") restored, as also a bas-relief in carved wood representing "History" which adorns the tympanum over the principal entrance of the Archives' building, opening on the Rue des Francs Bourgeois.—M. Willette, best known by his caricatures and illustrations to periodicals, is at work on a ceiling decoration for the "Cigale" Concert Hall, symbolising "La Chanson Française."—The Government has commissioned from M. Weerts a decorative panel 18 mètres long, intended for the "Cour d'Honneur" of the Sorbonne.—M. Dagnan-Bouveret has been commissioned to decorate a portion of the amphitheatre of the Faculté des Arts.—M. Louis Cordonnier, the architect, has been commissioned to direct the works for the building of the Hôtel de Ville at Dunkerque, at an estimated cost of 1,500,000 francs.

At l'Isle Adam, last Sunday, the monument to Dupré, the landscape painter, was inaugurated. The monument, carried out after the designs of M. Seillier de Gisors, architect to the Luxembourg, and son of the celebrated painter, is in the form of a semi-circle, in the midst of which is an erection with a triangular gable, beneath which is the bust of Dupré, by M. Marquette, carved on a stele. The basement is ornamented with a lion's head spouting water into a vase.—Two international railway lines between France and Spain are to be established across the Pyrenees. The first will start from Saint Giron, terminating at Lerida; the second will run from Oloron (Basses Pyrénées) to join the line of Saragossa and Barcelona. There will be a tunnel on each line of seven or eight kilomètres in length. The works are to be finished in ten years.

In the competition for a military commemorative monument at Remiremont the design of M. Adrien Gaudet has been selected for execution.—The Académie des Beaux-Arts has awarded the Jean Leclaire prize to MM. Jausse and Bernard, the pupils of the school who have done best during the year.—M. Alfred Delancey, an etcher of talent, is dead at the age of sixty-five. He had executed numerous plates of Old Paris, as well as a remarkable work of the principal cathedrals of France.—The death is also announced of M. Jacques Léon du Sautoz, painter, a former pupil of Drolling, and recently director of the school of drawing at Fontainebleau.

**GERMANY.**—The Emperor has granted 2,000£ towards the restoration of the historical church of St. Kilian, at Corbach.—The architect Christoph Hehl, of Hanover, has been appointed to the chair of Mediaeval architecture at the Berlin Technical College in the place of Professor Schaefer, who has accepted a similar post at Karlsruhe. Herr Hehl is a native of Cassel, and worked for some time with Messrs. Street & Scott, in London. This year's Art Exhibition contains his plans for the Garrison Church at Dresden in Basilica style, and for a town hall in the style of the Renaissance.—The autumn lectures at the Arts and Crafts Museum will include a course on "The Ceramic Art in its Relation to Architecture," by Herr Richard Bornmann.—According to the presidential address at the recent meeting of the Railway Society the total length of the German normal-gauge lines has increased from 37,308 k. in 1881 to 42,954 k. at the end of last year, of which 38,944 k. are owned by the State.—The municipality of Berlin has taken over the water-supply of Treptow, and 3,000£ is to be spent on the necessary conduits.—The Congress of Historical Art ("Kunstgeschichte") held its opening meeting last week at Cologne, under the presidency of Professor Carl von Lütow of that city. The chief item on the programme is the inspection of the numerous art treasures in the museums and churches of the city, as well as those in the hands of well-known private collectors. To commemorate the Congress, the municipality has presented every member with a Eumen's privately-printed work on the Cologne Cathedral.—The town of Halle has applied for permission to restore about a half of the Moritzburg, and has voted 10,000£ to this object. Should the permission be granted, the restored part is to receive the Municipal and Provincial Museums.—Traces of a Roman settlement have been discovered near Rothsburg, in the Palatinate, and excavations on a larger scale are to be undertaken next year. The finds include some well-preserved statuary, which has been placed in the museum at Speyer.—Lieutenant Dahm, of the *Limes* Commission, who is engaged on investigations in the district around Ems, has discovered traces of Roman fortifications along the right bank of the Emsbach valley, near Arnsch, and excavations are being actively prosecuted.

**AUSTRIA.**—The Emperor was present at the recent laying of the foundation-stone of a new church in the Ottaring, at Vienna. Cardinal Gruscha officiated.—The Vienna Arts and Crafts Museum has secured a collection of photographs of the furniture specially constructed for the "Achilleion," the Empress of Austria's palace at



GOLDSMITHS' COMPANY. —The "Technical







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# The Builder.

VOL. LXVII NO. 2568

OCTOBER 20, 1894

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### The London Building Act.—IV.

**T**HE legislation in regard to the "Rights of Building and Adjoining Owners" (Part VIII.) is less altered or modified in essentials than in the portions of the Act with which

we have hitherto dealt, but the provisions in this respect are differently arranged from those in the Act of 1855, and on the whole are more systematically and conveniently stated. This part of the Act commences (Section 87) with the statement of the rights of owners of adjoining lands respecting erection of walls on the line of junction. If the building-owner desires (1) to erect a party-wall on the line of junction he may serve a notice to that effect on the adjoining owner describing the intended wall. The period requisite for serving the notice, before commencing any operations, is not stated in this Section, but is covered by the general provision in Section 90, which states that the building-owner shall not exercise any of his rights under the Act until two months have elapsed after the serving of the notice in the case of a party-wall or party-structure, or one month in the case of a party-fence wall. In the existing law three months is required,\* which seems an unnecessarily long term, and the shortening of the period to two months is an improvement. If the adjoining owner consent, the wall may be built either half on the land of each owner "or in such other position as may be agreed between the two owners." Sub-section 3 provides that the expense of building the wall shall be from time to time defrayed by the two owners in due proportion, "regard being had to the use made or which may be made of the wall by the two owners respectively." The clause appears to establish clearly that a new party-wall erected for the first time—i.e., on a site not before built on and adjoining a site which is not yet built on—is to be paid for by the two owners conjointly, except in so far as the concluding sentence which we have quoted may be held, according to the circumstances, to relieve the adjoining owner from

his responsibility. In the existing law this case is apparently not contemplated, as the provision for sharing the expense is only specified in regard to a party-wall which is pulled down by reason of being defective or out of repair, or not in accordance with the law. In fact, the existing law on this point seems to contemplate a party-wall solely as a wall between two buildings, while the new Act (more properly) regards it as a wall between two properties, so long as it is connected on one side with a building. If the adjoining owner does not consent the building-owner can only erect the wall as an external wall, wholly on his own land. If, on the other hand, the building-owner does not desire to build a party-wall, but only a wall on his own land, in order to acquire the right to extend the footings on the land of the adjoining owner he must serve the latter with a notice one month previously, after the expiration of which time he is at liberty to build the footings, "with concrete or other solid substructure thereunder," on the adjoining land at his own expense, with compensation to the adjoining owner or occupier for any damage occasioned during the work. (The settlement of any difference as to the compensation is relegated to a special section on the settlement of differences, to be noted hereafter.) This is a very important addition, for it is, we believe, the fact that the existing building laws of London contain no formal and legal provision for building the projecting footings of a wall on the adjoining owner's land.

The section concludes with one of those absurd self-evident propositions (one or two of which have been noted already), to the effect that where an external wall is built against a party-wall, or against another external wall, it is lawful for the District Surveyor to allow the footings on the side next to such wall to be omitted. Lawful or not, the District Surveyor cannot say otherwise, unless it is supposed that he can order the adjoining wall to be cut into for the insertion of the footings of the new one. Clauses of this class, we imagine, must be the contribution of lawyers, who are only acquainted with buildings in descriptions on paper.

Section 88 defines the rights of building-owners. This corresponds to Section 83 of the 1855 Act, and is very nearly the same in wording and in the numbering of the Sub-sections. The only differences are that in Sub-section 1 the word "underpin" is added

to the phrase "a right to make good or repair," and the same addition is (by consequence) made in Sub-section 6; in Sub-section 9, to the sentence "a right to cut away any footing or any chimney-breasts, jambs, or flues, projecting" are added the words "or other projections"; in Sub-section 11, in place of reference to special previous Acts, the words run "shall be deemed to be conformable with the provisions of this Act if it be conformable with the provisions of the Acts of Parliament regulating building in London before the commencement of this Act." This refers to the right to take down party-walls or party-structures not in conformity with the Act. A new Sub-section (12) is added, giving the right to raise a party-fence wall, or pull it down and rebuild it as a party-wall, subject, as before-mentioned, to one month's notice to the adjoining owner (Section 90), in the case of raising the fence-wall, and two months in the case of rebuilding it as a party-wall. This latter point must not be overlooked; the party-fence wall can only be raised at one month's notice; if it is to be rebuilt as a party-wall it comes under Section 87 as such, and requires the two months' notice. Such at least seems to be the necessary deduction from the wording of Section 87, "if the owner desire to build a party-wall," as that includes the building of a party-wall where a party fence-wall formerly stood and has been removed. At the same time, we do not feel clear about the actual intention in this respect of Section 88 (12), or the possibility of a difference of interpretation in regard to it; but anyone intending to substitute a party-wall for a party-fence wall will do well to put himself on the safe side by giving the two months' notice.

While referring to the subject of party-fence walls, we may observe that the Act contains no restriction as to their height, except in the case where they stand partly on the "open space" of the minimum extent of 150 ft. in the rear of a domestic building, when they are limited to 9 ft. above the pavement level, by Section 41 (i). We may suspect that the intention in Section 41 was that the walls surrounding the open space were not to be more than 9 ft. high even when the "open space" exceeds the 150 square feet; but if so, the wording is faulty and may be in part evaded; the section only requires 150 square feet of "open space," and if that

\* Party-fence walls, as before observed, are not recognised in the existing Act, being exempt from official control.



is provided everything else is additional and beyond the requirement of the Act, and there is no restriction on the height of walls built on it, except within 10 ft. of the house. There it is restricted by the provision that the space must be the full width of the building, and extend to at least 10 ft. from its back wall; but beyond that distance the party fence-walls and boundary-walls could be raised to any height consistent with the other requirements of the Act as to height and thickness of walls. It is not likely they would be; but it is a curious oversight in the wording of the section referred to.

To return to Part VIII.: Section 89 defines the rights of the adjoining owner in almost precisely the terms of the present law (Section 84 in the 1855 Act), with only the alteration that "chimney-copings" are included among the works which the building-owner may be called upon to do as well as "chimney-jams," and the more important addition that the adjoining owner must require the building-owner "by notice" to execute the works referred to, and that to the sentence "as may be fairly required for the convenience of such adjoining owner" are added the words "and may be specified in the notice." It is to be noted however that the words "or may himself build," which occur in the 1855 Act, empowering the adjoining owner to carry out the desired works himself if the building-owner delays or refuses to do so, are omitted in the new Act. The adjoining owner, in other words, is to exercise the power given him by the law to compel the building-owner to carry out such works, but he is not to take them in hand himself. The words "by notice" are a simplification of the existing law and take the place of part of the provision of Section 85 (6) in the 1855 Act; the regulations as to the delivery of notices under the Act being given separately under Sections 187-188; to be noticed in their proper place.

The provision requiring the adjoining owner to specify the works required of the building-owner, and to give, if necessary, explanatory plans and drawings thereof, is repeated (Section 90) from the existing Act, as well as the provision that if either owner does not express his consent to the terms of any notice served upon him within fourteen days he shall be considered to have dissented therefrom, "and thereupon a difference shall be deemed to have arisen between the building-owner and the adjoining owner," a provision which, in the existing law, defines the point at which reference to an outside opinion shall be requisite. The existing provision that a building-owner is not to exercise any rights given him by the Act so as to cause unnecessary inconvenience to the adjoining owner (85 (3), 1855) is preserved in Section 90, with the addition of the words "or to the adjoining occupier." A new provision, in the same section is to the effect that when a building-owner, in the exercise of his rights under this part of the Act, lays open any part of the adjoining land or building, "he shall at his own expense make and maintain for a proper time a proper hoarding and shoring or temporary construction for protection of the adjoining land or building and the security of the adjoining occupier."

Another very important, and we may add very salutary addition to the existing law, included under Section 90, is to the effect that no party-wall or structure notice shall be available for the exercise of any right unless the work is begun within six months after service of notice and is prosecuted with due diligence.

Section 91 provides for the settlement of differences between building-owner and adjoining owner. The first sub-section of it is nearly identical in effect with Section 85 (7) of the 1855 Act. The differences are that in place of the words "arising under this Act" there is substituted the more specific expression "arising with reference to any work to which any notice given under this part of this Act relates"; in place of

the words "shall settle any matter in dispute," are the words, "shall settle any matter from time to time during the continuance of any work to which the notice relates in dispute;" and in the sentence, "any time so appointed for doing any work shall not commence" till after the expiration of the period prescribed by the notice, the words "unless otherwise agreed" are inserted between "not" and "commence." Sub-sections 2, 3, and 4 are practically identical with Sub-sections 8, 9, and 10 of Section 85 of the 1855 Act; in the last-mentioned clause, instead of the words, "as such one surveyor or three surveyors or any two of them may determine," the words run "as the surveyor or surveyors determine," which is only a more simplified expression of the same meaning. Sub-sections 5 and 6 are identical in effect with Sub-section 11 in the 1855 Act, and Sub-section 7 with Sub-section 12 of the same. Sub-sections 8 to 12 provide for cases where the surveyors appointed do not or from any cause cannot act; they are carefully worded so as to provide for all possible cases, and are practically the same as those in Section 21 of the Act of 1882, and their effect is as follows:—

(8).—Where both parties have appointed one surveyor, and he neglects to act within seven days, or die, the matters shall be determined as if he had not been appointed (*i.e.*, a fresh start is to be made).

(9).—Where the third surveyor has been appointed and does not act within seven days, the two surveyors shall select another "third," who shall have the same powers as his proposed predecessor.

(10).—Where each party has appointed one surveyor and they neglect within seven days to appoint a third surveyor (or "another third surveyor" where his predecessor has failed to act), a Secretary of State may on the application of either party select a fit person to act as third surveyor with the same powers.

(11).—Where each party has appointed a surveyor for the settlement of the difference and one surveyor dies or becomes incapable to act before the difference is settled, the party who appointed him may appoint in writing another surveyor in his place, and if such surveyor fail to act in seven days after notice served on him by the other party, the other surveyor may proceed *ex parte*, and his authority shall be the same as if he had been a single surveyor in whose appointment both parties had concurred.

(12). makes the same provision in the case where one of two surveyors appointed refuses or neglects to act for seven days.

Section 92 repeats the major part of Section 86 of the 1855 Act, as to power of a building-owner to enter on premises, but omits the latter part of it prescribing the penalty of 10*l.* for obstructing the entry, which is relegated to the general section of "offences against the Act." A new sub-section is added, however, requiring the building-owner to give fourteen days' notice of entry on premises except "in case of emergency," when he is to give "such notice as may be reasonably practicable."

Section 93 is an important addition to the existing law. It requires that when a building-owner is about to erect a building within 10 ft. of a building belonging to an adjoining owner any part of which (within the 10 ft.) extends to a lower level than the foundations of the adjoining building, he may, and (if required) shall underpin or otherwise strengthen the foundations of the adjoining building. He is to give two months' notice to the adjoining owner of his intention to build and whether he means to underpin the foundations of the adjoining owner, accompanying the notice by a plan and section of his own building showing the depth of the proposed excavation. If the adjoining owner gives a counter-notice within fourteen days either disputing the necessity of such underpinning, or on the other hand requiring it, a "difference" is deemed to have arisen between the two. The building-owner is

liable to compensate the adjoining owner and occupier for any inconvenience or loss which may result to the latter from the exercise of the powers conferred in this section; and nothing in this section is to free him from any liability to which he would otherwise be subject in case of injury caused by his operations to the adjoining owner.

Section 94 in its first paragraph repeats the provision of Section 77 of the 1855 Act, empowering the adjoining owner to demand security from the building-owner for the payment of such "costs, expenses, and compensations" (the word "expenses" is new) as he may become liable for, but is followed by a new clause empowering the building-owner to demand, after service on him of a party-wall or party-structure requisition, similar security from the adjoining owner, but only before commencing the work to which the requisition relates, not afterwards; and if the adjoining owner in that case does not give the security within a month he has lost the title to his requisition and the building-owner may proceed as if no requisition had been served on him.

Section 95, as to expenses in respect of party structures, is in its first four clauses (*a, b, c, d.*) on expenses to be borne jointly by building-owner and adjoining owner, identical with the respective sub-sections 1, 2, 3, and 4, of Section 88 of the 1855 Act. Clause *c* is nearly identical with Sub-section 5 of the 1855 Act, save that the first sentence of the old Act, "If any arches or communications, or any parts of them are pulled down, &c., is qualified thus: "If any arches or communications over public ways or over passages belonging to other persons than the owners of the buildings connected by such arches or communications or any parts thereof are pulled down." The exceedingly vague character of the old clause certainly requires some such qualification. As to expenses to be borne by the building-owner all the existing law is retained (1855 Act, Section 88) Sub-sections 6, 7, 8, and 9, with the following additions: (*a*) The existing phrase "any party-structure or any external-wall built against the same," which is obviously a contradiction in terms, is altered to, "any party structure or any external wall built against another external wall"; and in place of the words "be raised" we have "be raised or underpinned," which throws on the building-owner the cost of additions either at the top or bottom of the existing wall. The sentence "all such flues and chimneys were heretofore required to be made good" is rendered more precise in its bearing by being stated thus: "all such flues and chimney-stacks belonging to the adjoining owner or against any such party-structure or external wall as by this part of this Act required to be made good," &c.; (*b*) if a building-owner pulls down and rebuilds a party-wall on account of defects in it he is not only, as at present, to bear the expense of the operation, but also to make "a fair allowance in respect of the disturbance and inconvenience caused to the adjoining owner"; (*c*) and (*d*) repeat existing provisions; (*e*) provides that if a party fence-wall "be raised for a building" (which is in fact making it a party-wall, though not so stated) the building-owner bears the sole expense as also (*f*) in the case of a party fence-wall pulled down and rebuilt as a party-wall, will be observed that in this respect of the incidence of expense this case is put into a different category from the simple building of a party-wall, to which both owners are to contribute. The justification for this, it may be presumed, lies in the fact that in the case of party fence-walls the building-owner interferes with an existing erection partially belonging to the adjoining owner with no advantage to the latter. A succeeding clause, however, under the same section provides that if at any time the adjoining owner, in the case of any of the alterations described in this section, makes any use of a party-wall or party fence-wall which has been altered by the building-owner at his own cost, more than he did before the alteration



the adjoining owner shall bear from time to time a due proportion of the expenses (having regard to the use he makes of the wall); i.e., the building-owner must bear the cost in the first instance, but if the alteration proves useful to the adjoining owner he must pay in proportion. A provision, one would say, rather calculated to promote litigation.

The provision (Section 96) as to the amount of expenses to be delivered to the adjoining owner in cases in which he is to share the cost, stands as in the existing law, except for the requirement that the building-owner shall furnish an account in writing of "the particulars" as well as of the cost of the work; in other words, the adjoining owner is to have the right to know what he is paying for, and how the money has been expended.

Other provisions as to the settlement of the accounts between the two owners (Sections 97 to 100) remain as under the existing law, corresponding to Sections 96 to 99 of the 1855 Act; but Section 101, the final section of this part, introduces an important provision to the effect that nothing in the Act shall authorise any interference with an easement of light or other easements relating to a party-wall, or affect the right to restore any light "or other thing" connected with a party-wall, in the event of its being pulled down and rebuilt.

Part IX. deals with "dangerous and neglected structures." The first two sections embody the substance of Section 69 of the 1855 Act, re-arranged as to wording; the parenthesis in the old Act, which includes "anything affixed to a wall or building" being here separately expressed as a special definition (102) of "structure." In this part of the Act the expression "structure" includes "anything affixed to or projecting from any building, wall, or structure." In Section 103 the words "by the District Surveyor, or by some other competent surveyor" receive a qualifying clause to the effect that in this part of the Act the expression "District Surveyor" is to be read as including any surveyor appointed for the purpose of the section. A new provision is added, as a sub-section to 103, empowering the surveyor to enter upon any structure or land for the purpose of his survey.

Section 70 of the 1855 Act, which defines the meaning of the word "Commissioners" according as the structure is within or without the City boundary, is replaced by a parallel section (104) to the effect that where the "structure" is within the City this part of the Act shall be read as if the Commissioners of Sewers were referred to instead of the Council, and all costs or expenses hereby directed to be made to such Commissioners are payable to the Chamberlain of the City.

Sections 105 and 106 repeat the existing provisions in reference to the duty of the surveyor to "certify" as to the condition of the structure, and the notices to be given to the owner in case the certificate condemns the structure. The first clause of Section 107 corresponds in most respects with Section 73 of the 1855 Act, in regard to proceedings to enforce compliance with the notice, with the difference that the words "Petty Sessional Court" are substituted for "Justice of the Peace," and the more important difference that the words after "the owner," or in his default the occupier," are omitted. There seems to be a great uncertainty all through the Act as to whether "occupier" as well as "owner" should be made liable to the provisions of the Act; there is no principle that we can detect in the manner in which "occupier" is sometimes added and sometimes omitted; and why it should be specially struck out in redrafting the clause in regard to the case of a dangerous structure, when it is inserted in cases where the occupier has less immediate concern with the matter in hand, it is not easy to see. However, it is struck out, and the occupier may look on at a dangerous structure unmoved.

The concluding clause of Section 73 of

the old Act, making the owner of the structure liable for all expenses incurred in procuring an order for and carrying out its removal, is not included in the corresponding Section 107 of the new Act, but relegated to another section (109), in which latter section is included also the provision (Section 74 of the old Act) for the case where the owner cannot be found, the provisions in which case remain the same as at present.

The new Act is, however, less drastic in dealing with dangerous structures than the present one, for Section 107 empowers the owner of the structure, if he disputes the necessity of the provisions comprised in the notice, to demand within seven days a reference to arbitration. Sub-section 2 of this section defines the procedure in case of arbitration. The owner may appoint his own surveyor to report on the structure in conjunction with the District Surveyor, within seven days after serving his notice on the Council, and the two surveyors may refer any differences as to fact to a third surveyor appointed as arbitrator by them both, or (if they cannot agree) appointed by a Petty Sessional Court on the application of one of them. The arbitrator to award within fourteen days. The notice originally served by the Council is to be discharged, confirmed, or amended in accordance with the report of the surveyors or arbitrator, the surveyors' and arbitrator's costs to be borne by the Council if the award confirms their notice, or by the owner if otherwise (unless the arbitrator otherwise direct).

After finding that under 107 a "dangerous structure" may remain up for a month before anything is done, while the process of arbitrating is going on, one is not surprised to find in the next Section (108) that if the Council think immediate treatment of the dangerous structure is necessary a Petty Sessional Court may make any order in regard to removing or repairing the structure, notwithstanding the receipt of a notice demanding arbitration.

Sections 110 to 112 are new provisions as to the sale of dangerous structures under 109, Sub-section 2. They provide that the purchaser may enter on the land for the purpose of taking down the structure; that if the sale of the structure does not defray the expenses incurred by the Council, no part of the land on which it stands or stood shall be built upon until the balance due is paid, and that where the materials are not sold or the proceeds of the sale do not cover the expenses, the Council may recover the balance from the owner in a summary manner.

Section 113 includes the provisions of Sections 77 to 79 of the old Act, in regard to District Surveyors' fees under this part of the Act, with the difference that the Surveyor is to receive "the fees specified in Part II. of the third Schedule of this Act," instead of "fees not exceeding the amounts specified," as in the old Act. The existing power to remove inmates of dangerous structures is retained by Section 114 in the same words as at present. Section 81 of the old Act, empowering the "Commissioners" to appoint such persons as they think fit for carrying into execution this part of the Act, is abrogated, being unnecessary, as the authority to the County Council under the Act includes, as aforesaid, the Commissioners of Sewers (Section 104).

Section 115 as to "Neglected Structures" confirms the existing law as stated in Section 17 of the Metropolis Management Amendment Act 1882, in nearly the same words but with somewhat different arrangement, chiefly in the nature of abbreviation of wording; "Petty Sessional Court" is substituted for "Justice of the Peace," and (in Sub-section 4) the surplus over expenses (if any) arising from the forced sale of a neglected structure is to be paid "to the owner of the structure," in place of the present phrase "to the person entitled thereto."

Section 116 confirms, also with some condensation of wording, the existing provisions of Section 18 of the 1882 Act, substituting (as

before) "Petty Sessional Court" for "Justice of the Peace;" providing that every such order shall be "made in duplicate" in place of "signed in duplicate;" substituting the expression "County Hall" for "office of the Council," a small alteration significant of the architectural ambition of the County Council as to their future headquarters.\* An additional sentence is added to Sub-section 3 to the effect that "No property shall be affected by any such order" (i.e., the order forbidding the building on land where a neglected structure stood until the Council's expenses are paid) "unless and until such order is entered in such register." This is a necessary and important addition, as the existing law only ruled that the order would become void unless entered in the Register within ten days. It is now ruled that though entered within ten days, it is of no effect until it is entered.

The closing Section (117) provides that the fees specified in Part IV. of the third Schedule to the Act as payable to the Council can be recovered in a summary manner.

Part X. of the Act deals with the subject of "dangerous and noxious businesses," which were originally taken in hand as early as in the Act of 1844, on the provisions of which this portion of the new Act is founded. The substance of the long and involved clauses of this old Act is now subdivided into more manageable and intelligible sections. The provision that no building shall be erected nearer than fifty feet to a building used for any dangerous business is retained, as also the qualification that if a building erected within this distance before August 9, 1844 (the date of the first London Building Act), has been pulled down, burnt, or destroyed by tempest, it may be rebuilt on the same site. The last four words are not in the Act, but it is obvious that is the intended meaning. This seems to be paying a rather unnecessary degree of respect to legislation so far back as half-a-century. The establishment of dangerous businesses in any building or vault, or in the open air at a less distance than 40 ft. from the public way, or 50 ft. from any other building or any vacant ground belonging to any other person than his landlord, is re-affirmed in the same words, but the definition of dangerous businesses is modified. "Gunpowder or detonating powder" are omitted, as well as "vitriol" "fireworks" and "painted table-covers" (what were these dangerous table-covers of half-a-century ago?), and on the other hand "tar, resin, and Brunswick Black" are inserted in the new list. Section 119 repeats the same provisions as to "noxious businesses," but again with a revision of the definitions of such businesses, and a rather extraordinary one. "Blood-boiling" and "bone-boiling" are alone retained in the *index expurgatorius*, while "fell-mongers, soap-boilers, slaughtermen of cattle or horses, tallow-melters, knackers, and tripe-boilers," nearly all of which are tabooed by the existing law, are all here specially excepted! What is the cause of this sudden tenderness towards crafts which most ordinary persons would certainly regard as noxious? Have any of the members of the County Council ever been rowed on the Thames past "The Soapworks" below Hammersmith, which figure as a landmark in every description of the Oxford and Cambridge boat-race? If not, they had better try it, and they would probably revise their opinion that soapworks are not noxious, but unfortunately too late to alter the Act. Section 120 repeats the substance of Sections 54 and 58 of the 1844 Act, providing for a mitigated penalty where all the means known for mitigating the effect of such businesses are shown to have been tried, and for appeal from the Petty Sessional Court to the Court of Quarter Sessions. This section, however,

\* Or is this in anticipation of the glorious days when the County Council shall, as proposed, have swallowed the City Corporation and all its possessions, and the Guild-hall shall have become the "County Hall"?



only applies to businesses which existed before August 9, 1844. We cannot understand the principle of this exceedingly retrospective legislation, or why businesses which may have been nuisances for half-a-century should not now receive some little legal stimulus towards improvement. But the most curious point in this part of the new Act is this sudden and inexplicable tenderness towards businesses that have long been legally regarded as noxious. The manufacturers concerned in them must have cause of gratitude to their legal representatives, who have presumably stated the case for them and obtained them this unlooked-for exemption. Whether the general public will be equally grateful is another matter.

The substance of Section 63 of the 1844 Act, exempting gasworks, and distilleries under the survey of the Commissioners of Inland Revenue, from the provisions of the Act, is re-affirmed in shorter and less cumbersome language.

The consideration of the remaining parts of the Act, as to dwelling-houses on low-lying land, sky-signs, Superintending Architect and District Surveyors, legal proceedings and some others, we must relegate to a concluding notice in our next issue.

#### A DISTINCTION—WITH A DIFFERENCE.



MR. W. B. RICHMOND, A.R.A., contributed to the recent Church Congress at Exeter his views upon Architecture and Decoration with regard to Church Worship. With the tones of the speaker fresh in our ears we felt that we had been listening to a very noticeable paper. Mr. Richmond's confident delivery, his literary style, and the tact with which he seizes on dramatic points, produce their effect. But as the personality of the artist fades, and the substance of things spoken remains for reflection, we here and there experience the innocence of doubt. Literary chiaroscuro and bright dabs of verbal colour put on impasto are invaluable in a popular lecture, but we are cautious enough to take a man of Mr. Richmond's attainments seriously or not at all.

We may describe the tenor of the paper as "Darkest Art and the Way Out." Now, if anything is to pierce the intelligence of the average man, though he be clothed in black skirts, and even gaiters, it cannot be too often repeated. Well-worn theme as it is, the incompatibility of art and commercialism is little conceived of by those who hold our churches in trust. A repetition of this truth, then, in Mr. Richmond's trenchant phrases was needful and appropriate.

And the remedy, too, for the existing state of things was justly specified, which was this. Let the Arts unite; leave out the middleman and go directly to your artists.

But who are these artists? For it is in the endeavour to settle this question that we propose to discuss Mr. Richmond's paper, for while there exists any doubt as to whom we are to go, the way out remains undirected. Are they the architects who design and direct the building? Are they the painters and sculptors who exhibit at our popular shows and exhibitions? The term, we see, is a broad one. Certainly not the first of these, according to Mr. Richmond, the tradesman-architect as he calls him, bold enough to dictate about colour of which he can possibly know nothing. But the second and third are, as we were told, and it is to these that the decoration and finish of the building should be entrusted, the painter and sculptor who have been driven, against their inclinations into amassing fortunes as portrait makers by the wicked architect and his satellites of the public. We are never able, we confess, to take Mr. Richmond quite seriously in his robust condemnation of this fellow-being of his. As things are managed, the architect would seem to be as important a factor in the erection of a needful building as the painter is to the construction of the

equally needful annual picture show, a toy that Society cannot do without. Both are, unfortunately, the product of our vulgar and commercial age, and it is foolish that they should set a quarrelling, for neither the one nor the other of them can quite well afford it, when it comes to the pot calling the kettle black. But since we are about to show that the popular painter and the popular sculptor are most unsuitable people to perform such painting and sculpture as may constitute part of a building, we will as a set-off concede to the lecturer his little point at once. The gilded youth of Athens ranked her sculptors as tradesmen, and the architect need feel no shame that a gilded painter should do the same towards him.

To understand our argument it will be an assistance to consider the position of the painter and the sculptor with regard to architecture in other times than our own. In doing so we shall make it clear that the decorator of buildings was not the painter of easel pictures, nor was the sculptor of friezes he who carves portraits, and little suggestions for "Echo," or "Sleep," that look very well against a terra-cotta background, but which would be ridiculous amid the strenuous lines of architecture. Take any period of progressive art, and the fact is clearly borne in upon one, that in its growth Art follows decorative forms by instinct, while at a certain point of its development, as private patrons increase, and public enterprise diminishes, those forms give place to a freer treatment, and easel-painting becomes established; while in sculpture, the groups that fill a pediment or throng a frieze give place to creations of Antinous, say, or Aphrodite, as embellishments to baths or private palaces. And all this comes about by a natural evolution of social conditions. From the close of the fifth century B.C. painting in Greece was a purely architectural art. Polygnotos, Micon, and Panænos, the decorators of the Theseum and Stoa Poikile at Athens, belong to a totally different school from that of Apollodoros, Zeuxis, and Parrhasios, who succeeded them. The latter were painters of easel pictures, they were sought after by the public, and they dressed themselves in gold and costly clothing. Temple decoration forthwith fell to the sculptor, whose art from its very nature being less speedy of development and less capable of portraying those features of evanescence dear to popular taste, remained for a while in touch with architecture. And here, be it noted, we come in contact with a distinctly architectural form of sculpture running concurrently with a wealth of independent creative effort, the one the work of the skilled handicraftsman, the other of the renowned master. Frequently, too, the temple frieze is wrought by the architect himself, a sad instance of usurpation according to Mr. Richmond's ideas. To such an architectural school of sculpture, the frieze metopes and pediments of the Parthenon belong, the sculptors of which, although they had certainly studied under the influence of Myron and Pheidias, there is no reason to suppose were other than of the craftsman class. By the time we reach the Augustan age all such restraint, however, had vanished.

Italian painting went through exactly the same phases. What is known as pre-Raphaelite painting is distinctly decorative and architectural, and even when the style was losing its necessary simplicity, the fresco method, so true a one to its requirements, still lent the decorative quality. If Benozzo Gozzoli was the prince of decorators, we can still class Signorelli among the number.

In saying what we have, it is evident that we are in no way detracting from the genius of Zeuxis, or of Lysippos, or of Raphael. We simply affirm that decorative traditions were being lost when these artists lived, and that another order of art was taking its place. And when we say that the modern painter and the modern sculptor possess less tradition still,

we are saying what is *primâ facie* exceedingly likely. These belong to a later school than the decorative, and to search for an build up this latter it is necessary to go to more primitive source. This source, we have no doubt whatever, is to be found among the artists who sweat for the middleman. It is among these, imperfectly educated as they may be and needs must be that traditions linger. These possess some idea of the limitations of the materials which they work, while many amongst them have by a daily intercourse with their materials learned its possibilities also. It was to this rank and file that the mediæval craftsman belonged, and why should we not trust this class if a further development is to be hoped for at all? Such development would in the wise be following its natural outward growth, whereas it is a backward movement that Mr. Richmond would advocate. For even he, we imagine, would hardly assert that an average member of the Royal Academy was a likely person to practically carry out a piece of decorative wall painting. The popular painter has facility and some technical acquaintance with oil, as a medium, but even here this knowledge, it must be confessed, is limited as regards the durability and behaviour of his colours, for whose excellence he takes the word of the manufacturer. As a versatile artist Sir Frederic Leighton is a brilliant exception, but he is an exception because he is brilliant. Yet his excursions into other media than oil paint are so few as to be regarded rather than the light of essays.

This, then, is an answer to Mr. Richmond's inquiry as to why architects go to firms for the execution of decorative work. It is because the architect, by virtue of having studied architecture—the primer of all art—knows what he wants and what his building demands. Whether he always gets it belong to another story. And this study, we would add, does not alone consist in the building up of a store of feeble reflections. Continental travel, as the lecturer humorously judged, but by learning the art of construction and the temper of materials, and dry and prosaic office work may be; when once acquired, form becomes organic and its clothing natural. Therefore, when we are in accord with Mr. Richmond that the middleman must go before any serious progress can occur, and that the whole system of building be re-arranged (which would possibly re-arrange the architect also), we neither now nor thereafter expect any assistance from the painter or the sculptor, nor from the sculptor who embellishes the vestibule of Burlington House. These supply a demand of another nature, and there is no reason to suppose that such a demand will cease, though a demand for architectural sculpture and wall painting may spring up. The artists who will meet them when it occurs will, in the ordinary nature of things, arise from more primitive elements than the popular painter; from that class in short, whose faces and not their backs are turned towards the dawn, and whose effort will be freed when a check shall have been given to the exploiting of labour; a system which, looking at it upon purely economic grounds, wastes imaginative effort by enforcing the style of the one upon the many. And in this wise we are not sure that firms are a bit worse than academies.

A.A. CAMERA CLUB.—At the general meeting of the A.A. Camera Club, held on October 1, 55, Great Marlborough-street, Mr. George Flewood, F.S.I., was unanimously elected as President. The other officers and committee elected were Mr. E. W. M. Wonnacott, A.R.I.B.A., vice-President; Messrs. T. H. Bishop, J. P. Claughton, C. H. Freeman, and R. Eley Smith, A.R.I.B.A., committee-men; and Mr. Francis R. Taylor, hon. secretary. At this meeting the methods to be adopted by the A.A. Postal Print Exchange Club were discussed, and the first portfolio of architectural photographs was put into circulation. On October 2, several photographs and lantern-slides by members of the club were exhibited at the A.A. conversazione.



## NOTES.

**T**HE water now being supplied for public purposes in Leicester must be unsatisfactory in the highest degree. The ordinary sources have entirely failed, and for several days past the townsfolk have been compelled to drink the dregs of the reservoirs mixed with water obtained from wells hurriedly sunk and from private sources. Much of it is pumped directly into the town mains without undergoing any sort of filtration, and it is hardly necessary to add, the supply is considerably curtailed all round. It is fortunate for the Water Committee at this juncture that they have to deal with one of those towns the population of which is not particularly lavish even at the best of times with the precious fluid. When we learn, on authority, that the average consumption per head per day is only seventeen gallons for all purposes under the most favourable conditions, and this in a manufacturing town where factories use a considerable proportion of the water, we shudder to think how much more sorely taxed the Corporation might have been were the first principles of hygiene occasionally resorted to by the bulk of the inhabitants. On the 3rd inst. the Chairman of the Committee issued a protest against what he describes as "very exaggerated statements" then in circulation. Yet this same authority himself eight days previously felt the position so acutely that he officially stated there was then "only seventeen and a-half days' supply available, and the town must know that that was the very end of the chapter unless there was a fall of rain, or they were able to obtain an additional source of supply." There can be no question as to the cause of the failure—viz., the rainfall in the district being below the average; but it may well be doubted whether, with a little foresight, the authorities could not have provided against such a contingency. They are not entitled to altogether wash their hands of the matter. The rainfall there for the past two years has also been much below the average—only 21.73 in. and 22.5 in., instead of 28 in.—and they should have gathered experience from that and made more extensive arrangements for temporary supplies during the construction of the new works near Mount Sorrel. With reference to these latter we noticed the other day that they are being rapidly pushed forward, but some years must elapse ere they can be made fully available. Until then, it seems to us, the water-supply of Leicester cannot be placed on a very safe basis, though no doubt when the present crisis is passed the authorities will vastly improve their temporary works. Meanwhile, according to one account, the sewers, through want of flushing, are getting very foul; and, if this state of things continues, the health of the town will be seriously imperilled. The only satisfactory point we can see in the whole of the arrangements at present made is that the water from new sources is subjected to examination before being introduced into the water-mains, so that when it is really too bad it may be rejected.

**T**HE Scotch Coal Strike may be regarded as virtually settled, the men having been admittedly defeated; and it is impossible not to sympathise with the unfortunate victims now left out in the cold. In the face of what they had been repeatedly told, they could not bring themselves to believe that the struggle would end as it has done, and that no concession whatever would be obtained, except in a few isolated instances. They have held out with characteristic pertinacity, and permanent loss of employment now stares many of them in the face. Times were bad before, and now there is simply no work for them to do; either on the old or any other conditions. They are thus driven to seek continued support from England, and plainly state that "the British Federation brought them out, and ought not to leave them in starvation." The British

Federation have certainly met with very ill success in their endeavour to arrange how the Scotch coal trade should be carried on, and it remains to be seen what response they will make to the appeal of the unfortunate men who have been unable to obtain re-employment. Even those who have returned to work are appealing for further aid, having been completely impoverished by the strike. Sir George Trevelyan said at Glasgow, last week, that every good Scotsman had had the heart and brightness taken out of work and holiday alike, by the thought of the suffering caused by this disastrous struggle. "Every good citizen," he said, "earnestly hoped that light might come out of darkness, and good out of suffering, and that these questions should henceforward be settled, as they could be settled, and had been settled, and every day were settled in other businesses and other places, by conference and conciliation, instead of by methods which inflicted on the whole country evils hardly second to those of war." We are sure that these sentiments will be echoed on this side of the Border.

**I**T is curious to notice how quietly the Thirlmere Water Supply Scheme for Manchester has been accepted as an accomplished fact, after the fierce opposition which it excited in the first instance. Some of the original opponents, it appears, attended at the "function" of turning on the water on the 12th, and listened without interrupting to the somewhat exuberant eloquence of Sir J. Harwood, who was kind enough to say that he quite understood the feelings which had prompted the opposition, and that "love of the spot on which we first saw the light was one of the noblest impulses of the human heart." It is touching to learn, on the authority of the same speaker, that "Manchester men share this feeling in common with others"; they, too, are human. Whether Sir J. Harvey's claim that the works have done nothing to permanently injure the scenery is to be conceded, is a point on which we will reserve judgment. That it was of paramount importance for a town like Manchester to have a good and ample water-supply we have always maintained since the matter became a subject of discussion. But we do not quite wish to see it set up as an accepted creed that such works, necessary as they may be in some cases, are no injury to the natural beauty of the landscape in a peculiarly picturesque country. Engineers require no encouragement in this direction.

**A** GOOD many architects will probably have received during the last few days a mysterious black-covered pamphlet, under the title "A danger to public health," decorated with the ambulance cross in the middle, and purporting to be a reprint from the Local Government Journal of an article in opposition to mechanical ventilation, and in recommendation of what is called "natural ventilation." It is prefaced by a ridiculous illustration of the section of a hospital, with the inmates and doctors being poisoned by air forced in by mechanical means. Those who are puzzled by the circulation of this pamphlet, coming from nowhere, will probably be not far wrong in concluding that it is put in circulation by a firm dealing in "natural ventilators," as a means of influencing public opinion. We observe that the name of this journal is worked into it in such a way as to make it appear that we are on the side of the views advocated, by an ingenious partial quotation of paragraphs from an article in the *Builder*, without the context, which would have explained what their real bearing was. It is merely necessary for us to observe that the use of the name of this journal in apparent support of the views recommended is totally unwarranted, and amounts (as the concocters of the pamphlet know perfectly well) to a wilful misrepresentation of our position. We are

entirely opposed to the opinions which we are falsely quoted as supporting, and the whole affair is obviously a production circulated in trade interests, under the pretence of offering sanitary advice to the public.

**I**T is announced that Vol. I. of the Third Series of the "Architectural Association Sketch Book" will shortly be issued. Two or three specimen-plates have been forwarded to us, which seem to promise that this series of drawings of architecture and ornament will quite keep up to its old standard. The "Sketch Book" has now been published for a quarter of a century, and forms a most valuable collection of illustrations, many of which also are admirable examples of the best type of architectural drawing, but we are informed that though the number of subscribers has increased to some extent, the sketch-book still seems to be little known to a majority of the members. This must certainly be from ignorance of the value of its contents, and we recommend those who are not acquainted with the quality of the contents of the Sketch Book to turn their attention to it, after which they will probably become subscribers. The present editors of the Sketch Book are Mr. W. B. Lewis and Mr. John Begg.

**A** NEW edition of Spenser's "Faerie Queene" is announced by Mr. Allen, with illustrations by Mr. Walter Crane. It is to be published in monthly parts, the first part to be ready in November. This announcement will no doubt be of considerable interest to those who desire to have that great poem clad in artistic form. From the specimen page accompanying the announcement it is evident that this will be a very decorative edition in regard to headings, margins, and letters, and the style of these will harmonise well with the antique thought and language of the poem. Yet we confess that while welcoming this conventional decorative style for the purpose of headings and margins, we can by no means regard it as all that can be wished for in illustrating the "Faerie Queene." Where a small design forms part of the decorative filling of a page it should rightly be kept to a decorative style, and form part of the effect of the page as printed; but there is room for more than this in illustrating the "Faerie Queene." The poem has been lamentably neglected by painters, considering its extraordinary pictorial suggestiveness; and we should have been better satisfied if, besides producing a decorative page, it had been proposed to give some of the first painters of the day an opportunity of contributing imaginative scenes in a pictorial form in illustration of some of the main incidents of the poem. Flat decorative design is excellent in its proper place, but it is possible to feel a want of something beyond that.

**T**HE new number of the *Quarterly Review* contains an article on "The Earliest History of Babylonia," a review of M. Sarsac's "Découvertes en Chaldée" and some other archaeological works, which will be of interest to some of our readers. The same number contains also an article on "Rembrandt and his Art," a review of M. Emile Michel's *Life of Rembrandt*, and of Bartsch's *catalogue raisonné* of his engravings.

**T**WO old ecclesiastical properties are in the market. One is Studley Castle (nearly 2,800 acres), in the west of Warwickshire, named after a stronghold of William Corbuscon, or Corbezon, temp. William I. His successor (and, it is supposed, his nephew), Peter, gave a mill and lands here to the Knights Templar, and founded a monastery for some of the regular canons of St. Augustine, at Wicton, in Worcestershire, who migrated thence to Studley in



Edward III.'s reign. Peter's son and heir gave the advowson of St. Mary's church and patronage of the priory to William de Cantilupe, of Aston; the priory next went, with other possessions of the Templars, to the Knights of St. John of Jerusalem, 1313. William de Cantilupe and his son re-endowed the priory, so that at the dissolution its yearly revenue amounted to 125*l.* 4*s.* 8*d.* Henry VIII. bestowed the monks' possessions, with the manor, upon Sir Edmund Knightley, who left five nieces, his co-heiresses, one of whom, Joan, brought the monastery site in marriage to John Knotsford, of whose descendants there are several monuments in the church. The house contained some fine old furniture (late, so we believe), including a carved oak bedstead, of sixteenth-century workmanship. The other property is that of Scellières, near Romilly-sur-Seine, where are the ruins of a Cistercian abbey founded in 1167, and suppressed in 1790. Hither they brought Voltaire's body, in 1778, from the house of the Marquis de Villette, in Paris, at the instance of the then abbé commendatory, Mignot, Voltaire's nephew, and his tombstone still remains *in situ*. Under a decree of the National Assembly, on May 8, 1791, Voltaire's remains were exhumed and re-interred, July 11, in the church of Ste. Geneviève, as rebuilt by Soufflot, which in the following year was converted into the Panthéon, and where, in the vaults, is his now empty tomb.

A CORRESPONDENT calls our attention to the following remarkable editorial comment in the *Magazine of Art*, at the conclusion of some correspondence arising out of an article by Mr. Spielmann on "The Artist's Ghost":—

"We may further note that the architectural press, which usually calls attention to and discusses every matter bearing upon the profession which may appear in the pages of their contemporaries, have with one accord kept silence on this matter. We owe respect to their discretion if not to their courage."

If Mr. Spielmann's knowledge of other subjects he refers to is no better than his knowledge of this journal, as implied in the above remark, his lucubrations can scarcely be worth very much. The vice of designing and drawing by proxy has been a constant subject of comment in this journal for years. We have hardly ever commented on the annual show of drawings at the Academy Architectural Room for some time back without also commenting strongly on the prevalence of the draughtsman element in it, and the fact that not a quarter of the drawings are made by the men whose name they bear. We have objected to the five per cent. system on the very ground that it encourages a successful man to do by proxy more work than he can do himself, instead of charging higher, like other successful artists, for his own personal work. Everything like "ghost" designing in the architectural profession has had our expressed contempt for years, whenever any occasion for alluding to the subject arose, or when it did not arise. The appearance of Mr. Spielmann's first article, in July, was duly noted in our "Magazines and Reviews" column, but as it appeared to deal entirely with painting and sculpture we did not pay further attention to it. It appears that in the conclusion of the article in another number were some remarks upon architects' "ghosts," which escaped our notice, as (incredible as it may appear to Mr. Spielmann) we have not always time or inclination to read everything he has written. Because we omitted to notice the fact that Mr. Spielmann had been saying what we have been saying for years, we are to be told (by implication) that we dare not touch on the subject! A more characteristic instance of combined self-conceit and impertinence we have seldom come across, even among "art-critics" (which is saying a good deal).

\* We may add that if Mr. Spielmann knew as much about the architectural profession as we do, he would know that, however the practice of engaging draughtsmen to

WRINGTON, Somerset, is to be sold; an estate of about 6,000 acres, traversed by the river Yeo, and including a part of Wrington Vale, near the Mendip Hills, with Burrington Combe, where were found two natural caverns containing numerous remains of prehistoric man. Until the dissolution Wrington belonged to Glastonbury: it was granted to Sir Henry Capel, whose descendant, the third Earl of Essex, sold it to the Earl of Bath, from whom it passed to the Dukes of Cleveland. The church is famed for its lofty western tower, of which the second stage has in each side two very high windows, with double transoms, and separated by tall shafts ending in crocketed pinnacles. At the tower angles are double buttresses, with crocketed gables; above these rise four pinnacles and richly-crocketed pinnacles. All the parapets have open traceried work. In a thatched cottage (since removed) near the church John Locke was born. In the church is a monument to Hannah More and her sisters, who lived many years in a cottage they built at Barley Wood, in this parish.

THE Art Union of London have presented to their subscribers a large etching by Mr. David Law, from the picture by Mr. J. Clayton Adams which was exhibited at the Royal Academy last year. The plate has none of the essential quality of etching, being properly speaking an engraving carried out with the etching-needle, in that overfurnished style which is little appreciated by those who understand what "etching" really means. No doubt, however, the Art Union, which caters for the popular taste, has gauged pretty accurately the probable artistic standard of its subscribers, and an Association which (according to its Report) can see in the Tate Gallery "an important addition to the architectural adornment of London" can hardly be expected itself to take a very high aesthetic standard.

THE opening *conversazione* of the Architectural Association, which was held in the Queen's Hall on Friday the 12th, went off very successfully, and is considered by the members to be one of the best they have had. The large space which the area of Queen's Hall afforded for promenading, with the option of taking seats in either of the balconies, of which many availed themselves during a portion of the evening, gave an agreeable sense of ease and plenty of room to move about, and there was no crowding except in the refreshment room, where it is nearly always inevitable on such occasions, during the period of the evening when a common sympathy leads all present to seek the same goal at the same time. The Rebec Orchestral Society, a band of about forty, went through a programme which both in selection and execution was above the average standard of *conversazione* music; the Pierrot Banjo team supplied the lighter element at intervals, and though we confess that we detest the banjo, one or two of the comic songs exhibited real humour and cleverness. We had even something so classical and "advanced" as duets, by two well-known modern French composers, for the piano and organ, played by Mr. Leonard Butler and Miss Bonavia; that these were not very successful was the fault rather of the composers than of the players. Of the things to please the eye (among which we cannot include the permanent decorations of the hall) were some fine carpets and rugs lent by Messrs. Bontor and Messrs. Turberville Smith; hangings and tapestries from Messrs. Barbour & Co.;

make show drawings of a building still prevails, the more serious vice of signing a *design* made by another man belongs more to the old than to the new generation. Among the younger generation of architects who have acquired any position or success we have reason to believe that all carry out their own designing personally, with the exception of mere mechanical work. There are no doubt obscure "architects and surveyors" who pay for other men's designs, but one is hardly bound to take account of the doings of that class of persons, in estimating the *moral* of the profession.

wall-papers and panels and friezes in copper from Messrs. Jeffrey & Co.; wall-papers and tapestries, a dossal of red velvet with gold embroidery, and an altar with brass furniture, by Messrs. Watts & Co.; wall-papers by Messrs. Heffer, Hayward, and Essex & Co.; inlaid cabinets and furniture by Messrs. Collinson & Lock; fabrics and carpets by Messrs. G. P. & J. Baker; sideboards, tables, and chairs in a group, by Messrs. Waring & Co.; electric light fittings by Messrs. Farraday; and a collection of ancient processional crosses, wrought iron work, by Messrs. Singer. Among the members' exhibits were photographic lantern slides by the "A.A. Camera Club"; photographs of the Architectural Association's excursion to Wells, by the late (we regret to have to say) J. L. Robinson; various drawings by students, among them Mr. C. C. Brewer's travelling student's drawings and some good work of the Association Colour Class. Mr. Phené Spiers also lent some of his water-colour drawings. The floral decorations were by Messrs. Wills & Segar. It was estimated that there were about 800 persons present.

#### THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee the following loans were granted on the usual conditions:—

To the Vestry of Fulham—1,250*l.* towards defraying the cost of certain works of improvement, paving, and sewerage in that parish. To the Vestry of Islington—4,400*l.* to defray the cost of paving with wood certain parts of the carriageways of St. Paul's-road, Holloway-road, and Park-street in that parish; 3,900*l.* towards the cost of acquiring certain property for the improvement of the Norfolk-square area, under the Housing of the Working Classes Acts, and 1,350*l.* towards defraying the cost of providing additional office accommodation at the Vestry Hall for the transaction of the business of the Vestry. (The Vestry propose to take off the roof of their existing general office and to erect a large room about 62 ft long by 31 ft. wide, with sub-divisions, and to improve the elevation and re-roof the building at an estimated cost of 1,319*l.*, for which amount the work has been agreed to be carried out). To the Vestry of St. Martin-in-the-Fields, 10,500*l.* to defray the cost of re-constructing certain brick and pipe sewers in the Strand, Adelphi, and other parts of the parish; and 5,350*l.* re-borrowed for the purposes of the Green-street improvement. To the Islington Baths Commissioners 10,000*l.* towards defraying the cost of the erection of public bath and washhouses. To the School Board for London 200,000*l.* for the purposes of the Elementary Educational Acts.

Applications under the Building and Management Acts.—The Building Act Committee recommended that an application by Messrs. Landers and Bedells, on behalf of the President and Governors of the Royal London Ophthalmic Hospital, for the consent of the Council to the erection of a hospital building on the south side of City-road, St. Luke, at the corner of Gayton-street, to the line shown on the deposited plan, be not granted, it being deemed undesirable to permit the frontage at the portion of the road in question to be advanced as proposed. It was also considered that a much more liberal dedication of land to the public should be made than was shown on the plan submitted.

The recommendation was agreed to. An application by Mr. R. H. Padbury, for the consent of the Council to the substitution of duroline for glass in the action of the roof of a covered way recently sanctioned in front of No. 9, Hilldrop-road, West Hampstead, as refused, as the use of duroline for the purpose proposed was considered objectionable, and having regard to the tests to which it had been subjected, could not be deemed to be incombustible material within the meaning of Section 19 of the Metropolitan Building Act, 1855.

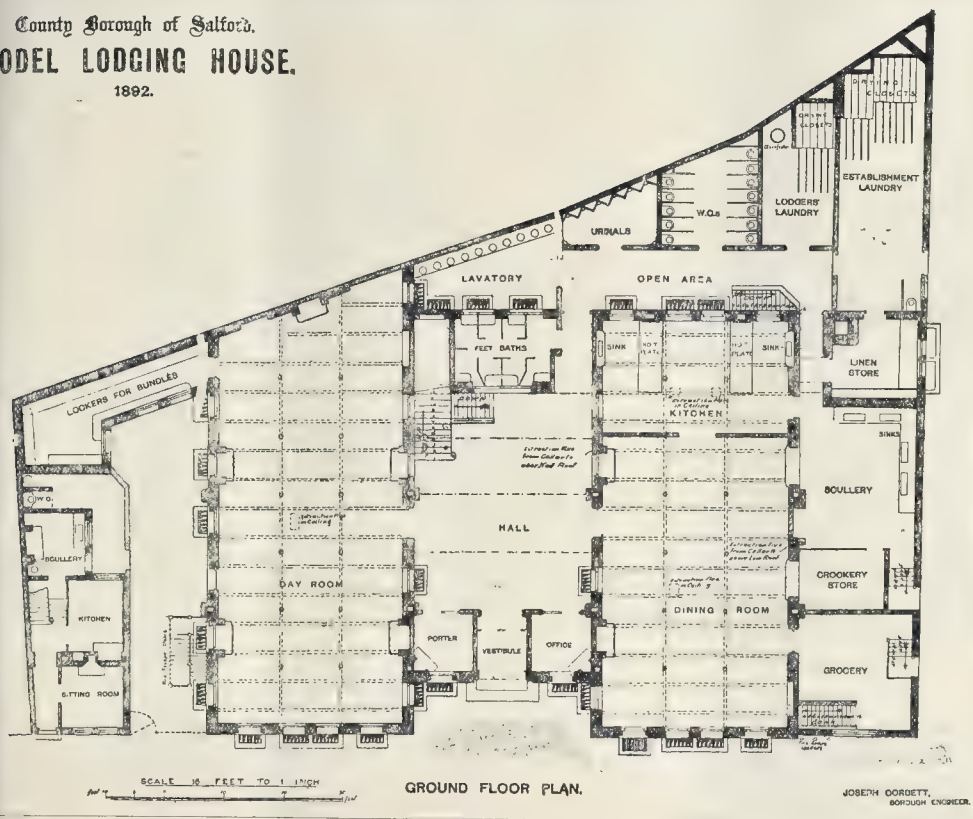
Appointment of Assistant in the Building Branch.—On the recommendation of the Works Committee, Mr. Francis Ruddie, who has been employed in the quotation branch of the Works Department, was appointed for three months on



County Borough of Salford.

# MODEL LODGING HOUSE.

1892.



probation second assistant in the building branch at a salary of 200l. per annum.

**Wood Paving.**—Mr. Arter moved the following resolution:—

"That it be referred to the Finance Committee to consider whether the term of years for which loans are now granted to Vestries and District Boards for hard wood paving may not properly be extended, in view of the greater durability of that wood as compared with the soft wood hitherto in use."

Mr. B. Hopkins seconded the resolution, which was agreed to.

After a sitting of one hour and a half, the Council adjourned.

## MODEL LODGING-HOUSES, SALFORD.

We give the ground-plan of these houses, which have just been opened. The ground-plan explains itself; the dormitories, on the cubicle system, occupy the three floors over the dining-room and day-room. The cubicle divisions are of sheet-steel. Each cubicle against the wall has a window, part of which is hung on pivots, so that the inmate may command extra ventilation for himself without interfering with the general ventilation of the ward.

From the ceiling of each room a foul-air out-shaft runs up to the roof, where it terminates in a cross tube running from one side of the roof to the other, with louver outlets; so that the wind, from whichever direction it blows, may create an "exhaust" at one or the other end of the cross tube.

The fresh air inlets are all provided near the roof level. Those in the dormitories are all constructed so as to bring the air into the aisles or passages, not into the cubicles, and the heating coils are so arranged that the cold air impinges upon them and may be warmed before being distributed through the room. In the day-room fresh air is admitted through the Galton valves, and is warmed to a comfortable temperature before distribution. The dining-room will only be used for short periods, and the opening windows will suffice for its adequate ventilation.

The whole construction of the building is, as far as possible, fire-resisting. The floors of the dormitories and day-rooms are of solid planks,

grooved and fitted with iron tongues; the stair-treads are of greenheart timber, carried on steel framework; the cubicle divisions are of sheet-steel. The floors of kitchen, scullery, and bath-room are constructed of rolled steel joists and concrete. The contractors for the main building were Messrs. Wm. Southern & Sons, and the plans, specifications, and quantities were prepared in the office of the Borough Engineer, Mr. Corbett. Mr. T. B. Patterson has acted as Clerk of Works.

## COMPETITIONS.

**MARKET, WESTON-SUPER-MARE.**—The result of the competition for new Market, Weston-super-Mare, has just been declared. The 1st premiated design is by Messrs. Price and Wooller, of Weston-super-Mare; the 2nd, by Messrs. S. J. Wilde and Bryan, also of Weston-super-Mare; and the 3rd, by Mr. Daniel Arkell, of Birmingham.

## ARCHITECTURAL SOCIETIES.

**SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.**—The annual conversation of this Society was held at the Cutlers' Hall, on the 11th inst., when a large number of guests assembled, and witnessed the presentation of prizes to the successful students. This, though not the first occasion on which the Society has held gatherings of a similar character, is a departure from the procedure of previous years, the council considering it would be for the benefit of the Society if the ceremony were made of a more public character. In the course of a brief address, the President, Mr. E. M. Gibbs, having referred to the exhibition of sketches and measured drawings of ancient buildings in the district, executed during the summer months by the younger associates and students of the Society, went on to say that as that was the first occasion upon which they had had a considerable number of visitors at an opening meeting, he might explain that the work of the society was largely educational. They carried on their work in the form of lectures and discussions on special subjects, and the formation of a library for the benefit of all their members, and in the form of classes on the study of

the history and styles of architecture, sketching, designing, and surveying and levelling for the benefit of the younger members. The exhibits of the sketching class shown that evening were only a small part of the educational work of the society. He hoped the work of the other classes would be as fully exhibited next year. The Society was also active in matters relating to professional practice, and desired, whilst protecting the interests of the profession, to command the respect of the general public by maintaining the honour of its members and the standard of their ability to solve successfully the complex problems of modern building. At the request of the Council of the Royal Institute, he called special attention to the new examination in architecture and to the new form of application for architects and chief assistants. He then proceeded to the distribution of the prizes to the members of the sketching class. The first prize was awarded to Mr. Frank W. Chapman for sketches and measured drawings of parts of the churches of Ecclesfield, Whitwell, Beauchief Abbey, South Anston, and Laughton-en-le-Morthen, and other places in the neighbourhood; and the second prize to Mr. J. C. Amory Teather for drawings of the same buildings.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—The second lecture of the Session of this Association was delivered in the rooms, 114, West Campbell-street, on Tuesday evening—Mr. A. N. Paterson in the chair—when Mr. P. McGregor Chalmers, F.S.A.Scot., read a paper on "The Abbeys and Cathedrals of Scotland." He pointed out that local tradition is often interesting, but, as a fabric reared by memory and imagination, it can aid us but little where scientific accuracy is required. It might be thought that in the mass of literature published since Scott revived the interest of Scotchmen in the beauty of their own country and its history, there would be found all the material necessary for the history of our Abbeys and Cathedrals. Closer acquaintance, however, showed that it is seldom more than a local tradition. The writers generally have been men of culture, but with few exceptions had no knowledge of art. When we turned to ancient charters we might think we had at last found

some foundation, but the writings of past ages had been a most prolific source of error. An illustration in point occurred in the charters relating to the building of the central tower of Glasgow Cathedral; a part of the erection which was commonly attributed to Bishop Wishart. The lecturer showed that this was erroneous, and that the tower really erected by Wishart, and restored by Lander, was the north-western tower removed sixty years ago. It was a favourite practice for a local magnate or chief prelate to have his arms carved on the building erected or restored by him, and in this connexion he argued that the arms of Archbishop Blackader which appear on the remarkable aisle of Car Fergus were not a record of building, but only of restoration. The presence of names or arms was not an infallible guide to us in our study—that infallible guide must be found in the art itself. Mr. Chalmers afterwards exhibited a series of views by limelight, covering the country from Kirkwall to Durham, and from St. Andrews to Iona, arranged in chronological order. At the close the lecturer received a hearty vote of thanks.

#### GRILLES AT ST. OUEN, ROUEN.

THESE grilles are most probably the work of Nicholas Flamant, a smith who flourished in Rouen about the middle of the eighteenth century. They bear the inscription: "FAIT"—"E—FINI"—"JVIN"—"1747." The iron used is 1½ in. sq. for framing and supports to pediment, 1 in. sq. for panelling; scrolls, ½ in. by ½ in., ¾ in. by ¾ in., and 1 in. round. The foliage is cut from ½ in. and ¾ in. sheet-metal, rivetted to the scroll-work. The bases and cornices are built up with sheet-metal on frames. The gates and railing to the side chapels are also in this style, and are probably from the same hand. There is remarkable flow of line and freedom in the forging of the leafage.

B. J. FLETCHER.

#### Books.

*Modern Methods of Sewage Disposal for Towns, Public Institutions, and Isolated Houses.* By GEO. E. WARING, JUN., M.Inst.C.E. New York: D. Van Nostrand Company. London: Sampson Low, Marston, & Company, Limited. 1894. Pp. vi., 252.

**W**HEN the history of the technical literature of this century comes to be written, a considerable section will have to be devoted to works on sewage-disposal, and among these honourable mention will, we believe, be made of Mr. Waring's new book. It is not a large book—indeed, it might, in comparison with some other works on the subject, be called a little book—but it is an extremely useful and interesting one. The author has not contented himself with merely collecting a mass of information, cutting it up into chapters, and calling the resultant medley a book, but he has carefully collated his information, and arranged it in an orderly fashion. The result is a book which gives the newest theories and data of sewage-disposal clearly and concisely, and which cannot fail to be of great use to students and to those laymen whose public duties may induce them to acquire a general acquaintance with the leading principles of the subject. The book does not pretend to go minutely into practical details, and the engineer will have to look elsewhere for such information, but it certainly fulfils the author's intentions of providing a book which "will have some value and will offer some suggestion for engineers," while, at the same time, it will be of use to "sewerage-committee men and others who may have occasion to look at the subject from the layman's point of view." The two chapters on "Sewage Disposal for Hotels and Large Institutions," and "Sewage-Disposal for Village and Country Houses," are of especial interest to architects; the former chapter shows the adaptation of broad irrigation to several buildings, and the latter describes sub-irrigation as applied to isolated dwellings. Eighteen out of the twenty-two illustrations in the book occur in this latter chapter, and the description of the works is in this case full and exact. Mr. Waring is in favour of the separate-sewerage system, and of land-treatment of sewage (either by irrigation or filtration, both, however, intermittent), although he does not, of course, say that chemical precipitation is never desirable.

The valuable reports prepared for the Massachusetts State Board of Health (1883 to 1894) are largely drawn upon, especially in the chapters on "The Theory of Decomposition" and "Chemical Treatment." English authorities



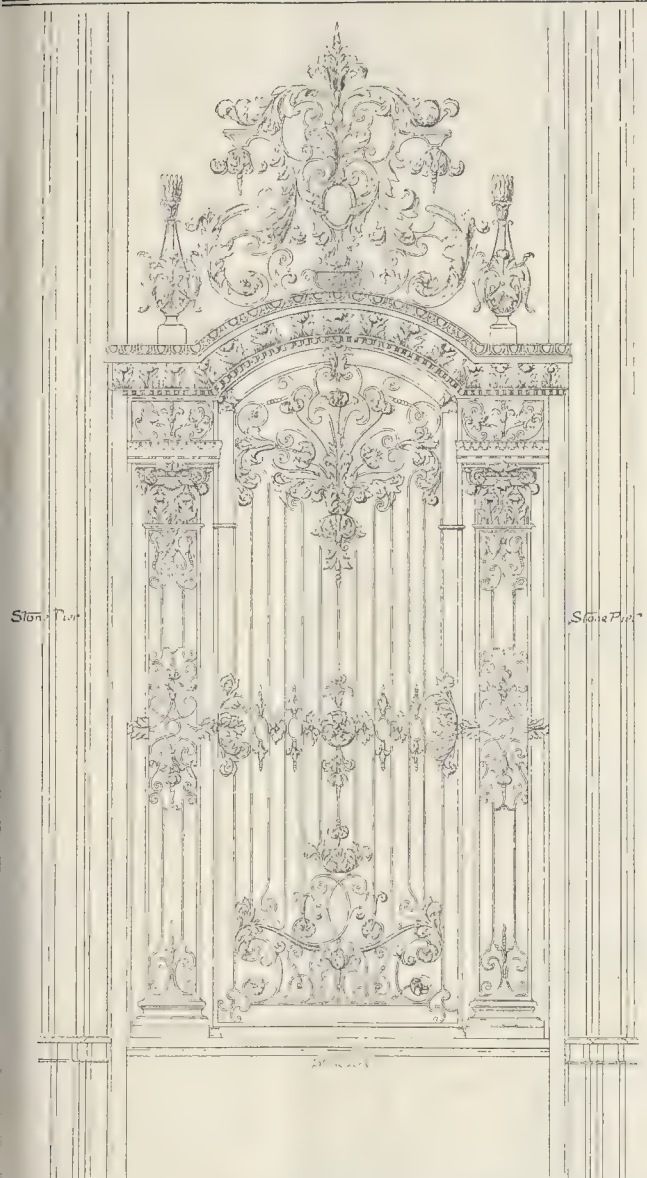
Grille, St. Ouen, Rouen. Drawn by Mr. B. J. Fletcher.

are also frequently quoted, although Mr. Waring makes bold to say that "in considering the requirements of disposal, we [i.e., Americans] should not be too much influenced by the experience and practice of England, where a natural tendency to conservatism has led to the continued use of methods which would not have been adopted had engineers known twenty years ago what is well known now."

In issuing an English edition of this book, attention should have been called to the facts that American sewage is much more dilute than English, and that the American gallon is to the English gallon as 8:33 is to 10. As this has not been done, the figures relating to filtration, &c., may mislead the English reader. The volume, we may add, is well printed on good paper, and contains an excellent index. We heartily commend the book alike to the student of sanitary engineering and to the layman who desires a careful and interesting guide to the subject of sewage-disposal.

*Sanitary Work in the Smaller Towns and Villages.* By CHARLES SLAGG, A.M.Inst.C. Third edition, enlarged. London: Cross Lockwood & Son. 1893. Pp. x. and 270. THE careful reader of the title-page of this book will gather that this is merely an enlarged, and not a revised, edition. A publisher's note tells us that on account of the death of the author in January, 1893, no revision has been attempted, and that the present issue "is substantially a reprint of the second edition with the addition of a reference (p. 241) to the 'Water Companies (Regulation of Powers) Act' of 1887, and of an APPENDIX, in which is set out Part III. of the 'Public Health Acts Amendment Act' of 1887 relating to Sanitary Work." These additions are apparently so much padding inserted for the sake of placing the word "enlarged" on the title-page of the book. The book is really a second edition, and is therefore about ten years post-dated, and most of the information contained in it actually dates from the sixties or earlier.





Grille, St. Onen, Rouen. Drawn by Mr. B. J. Fletcher.

seventies. No wonder, then, that nearly every chapter fails to give information which the modern student ought to know, or gives information which he would do well not to know. Section VI., Part I., on the "Dampness of Houses," begins with the statement that "it is unnecessary to describe the many evil effects of dampness of the floors upon which, and the walls against which, people lodge," and yet not a word is said as to preventing the dampness of floors by an asphalt layer, or of walls by a vertical asphalt damp-course or by a cavity. The drainage of the subsoil of dwellings is not insisted upon, this being "a question to be determined rather by the doctor than by the engineer" (!); and even when it may be considered advisable to drain the subsoil, the author appears to consider (2, pp. 92, 94, and 98) that the only method is to leave the upper halves of the joints of the sewage-drains unstopped with clay or cement. None of the specially-jointed drain-pipes are mentioned except Stanford's; Hassall's, Archer's, the "Cronin," and others are beyond the publisher's or editor's

ken. Even "wash-down" closets, valve closets, pedestal closets, and closets like Duckett's, flushed by waste water, are not referred to. The subject of cast-iron drains is dismissed in five lines. Nothing is said about lead soil-pipes, or glass-lined iron pipes, or about soil-pipe ventilators. The different forms of lead-traps for bath and lavatory wastes are not considered. The purification of sewage is said to be "essentially a chemical one, either natural-chemical or artificial-chemical," as if the researches of Warington, Frankland, and others, respecting the biological aspect of the question, had never been made. The remarks on the cleansing properties of different kinds of soil are remarkably inexact: "A clayey soil seems to possess the requisite properties in a greater degree than others; but if the land be a stiff retentive clay it is so dense, of itself, that a larger area is required, while sand of itself has no purifying properties other than those which porosity gives it." In the sections relating to water-supply, although seven or eight pages are devoted to a

discussion of water-supplies obtained from moorland areas, nothing whatever is said of the solvent action of such water on lead pipes, and the consequent danger of lead-poisoning to those who habitually partake of it. We could say more, but we have said enough to show how out-of-date the book now is. When first published, it could honestly be described as good, but it cannot now, and the publishers are undoubtedly injuring their own reputation by re-issuing such books as this without thorough revision.

*Refuse Destructor, with Results up to Present Time*; second and revised edition; a Handbook for Municipal Officers, Town Councillors, and others interested in Town Sanitation. By CHARLES JONES, M.Inst.C.E., &c. With a Paper on *The Utilisation of Town Refuse for Power Production*. By THOMAS TOMLINSON B.E., A.M.I.C.E. With numerous Diagrams. London: Biggs & Co. 1894.

THE nucleus of this volume is the substance of a paper read by Mr. Jones at a meeting of the Association of Municipal and Sanitary Engineers at Leicester in July, 1887. To this Mr. Tomlinson's article on "The Utilisation of Town Refuse for Power Production" has been added; Mr. J. H. Cox, M.Inst.C.E., contributes an account of the disposal of town-refuse in Bradford; Mr. H. P. Boulnois, M.Inst.C.E., writes briefly on the disposal of refuse in Liverpool; and Mr. C. H. Lowe on that in Hampstead; while the *Scotsman* is quoted respecting the Powderhall Destructor at Edinburgh. To the seventy-three pages occupied by the matter just mentioned, there are added about fifty-six pages given by the engineers and surveyors of forty-six boroughs, &c., to thirty-one questions asked by Mr. Jones respecting the destructors at work in those places. Twenty-four clear and practical plates, in illustration of different kinds of destructors, &c., complete the volume. We may say that Livét's destructor, now in operation at Halifax, is not mentioned; this is to be regretted, as it is an interesting attempt to utilise town-refuse for the production of electricity for lighting the town. The book contains much valuable information not to be found elsewhere in any single volume, but so ill-digested that reading it becomes burdensome. The preface tells us that "the author lays no claim to what is generally termed authorship." It is a pity that he did not aspire to the honour; had he done so the book would probably have been much more valuable than it is.

*Elementary Drawing; Being a Few Practical Hints for Art Students and Teachers*. By H. FOSTER NEWEL, Assistant Master of Birmingham Municipal School of Art. London: Chapman & Hall. 1894.

FOR a small elementary book, this is a very good one. Its teaching is very clear and intelligible, and marked by sound common-sense in regard to the aims and methods of drawing. The author sets out from the commencement by urging the invaluable habit of thought accompanying drawing; of getting a clear perception of the construction and meaning of an object before endeavouring to represent it; and carefully considering the meaning and intent of each line before drawing it. "The more intricate or full of detail a copy may be, the more construction will it contain, and therefore the more constructive should be the method of drawing it. By this means we shall build up our copy upon the same lines upon which it was designed." The few illustrations given show very clearly the best method of doing this; and this application of thought and observation going concurrently with the pencil is kept in view throughout the following chapters, which treat successively of model drawing, drawing from casts, shading from models, brush-work, &c. The book is a small and inexpensive one, but a most useful primer for the beginner in drawing.

**LEAD-POISONING AND THE WEST RIDING COUNTY COUNCIL.**—The General Purposes Committee of the West Riding County Council have had under consideration complaints of lead-poisoning, as to which they have been asked to hold inquiries and make experiments with the view of finding a remedy. They have come to the conclusion that they cannot undertake to hold inquiries, but they have directed the Riding Solicitor to communicate with the Local Government Board with the view of obtaining powers by which County Councils can prohibit the use of lead-pipes in connexion with any public water supply.



Plan of Design by Messrs. Baggallay & Bristow for Treatment of the Roman Bath at Bath, and the proposed new Buildings.

### Illustrations.

#### DESIGN FOR COVERING IN THE "GREAT ROMAN BATH" AT BATH.

**T**HIS drawing illustrates a design submitted in a recent competition. The problem was to cover in the old bath and erect a terrace, or gallery, in it with as little injury to existing remains, and as little outrage to the *genius loci*, as might be. It seemed to the authors that the latter condition could be best fulfilled by allowing the ancient remains to rule the modern design, at least in its main lines, and by avoiding any features and details of an obtrusively non-

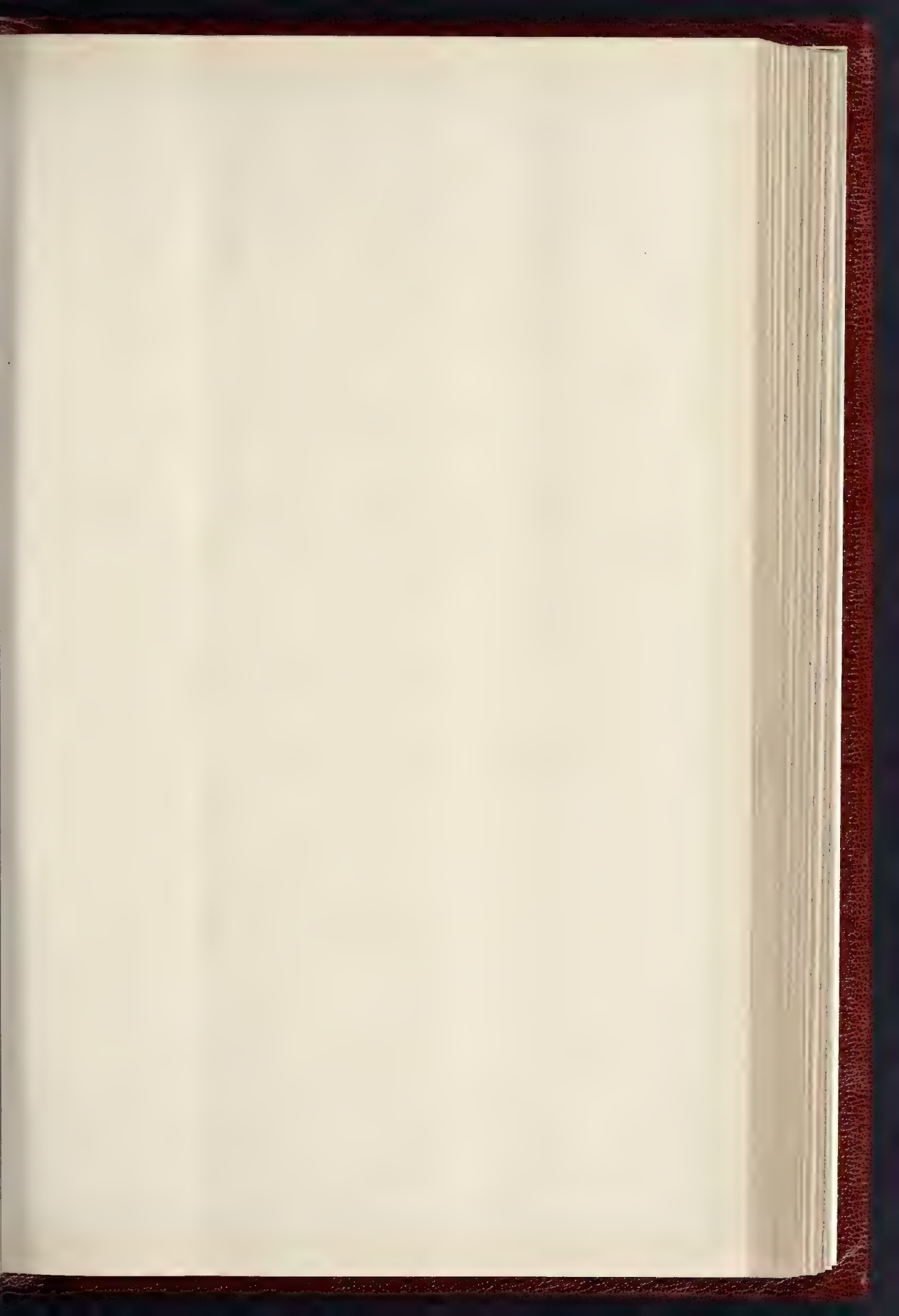
Roman character. The unforeseen result was the production of a design which has led critics to call it a "restoration," though, archaeologically, it would be a very incorrect and improbable one. The authors have been condemned as wanting in respect for the remains, because they proposed to build upon the stumps of the old piers; but with all respect to the authorities who have supported this view, and the covering of the site with a single-span roof, they believe that more respect would have been shown to these remains by putting them again to their original use, and by accepting their suggestion for the treatment of the superstructure, than by leaving them as mere objects of

curiosity to visitors, or of interest to dilettante antiquarians. Even if it had been necessary to re-bed some of the old stones, neither by that means, nor by covering over the existing top beds of the piers, would any evidence of the slightest scientific value to archaeologists have been destroyed, while covering the site with a single-span roof certainly seems like a wanton insult to the original designers. To the architectural associations of the place, it may be incidentally remarked that the piers do not monopolise the case of the objectors, nor have a word to say against building up the surrounding walls.

BAGGALLAY & BRISTOW

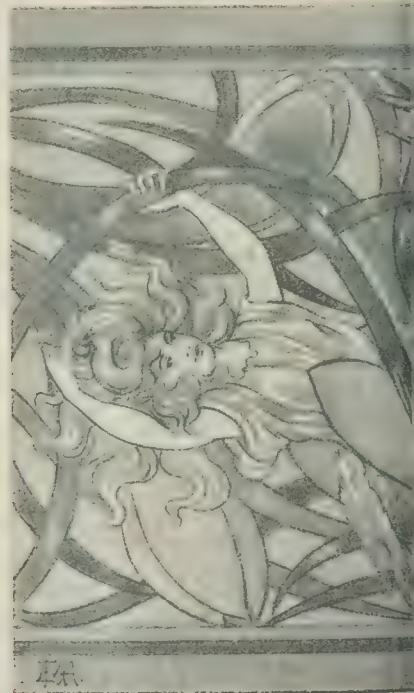
\* \* We fear we are among the critics







DESIGN FOR



'AWAKENING OF SPRING'





R. PATON WILSON



IGN—By MR. EDWARD M. ATKINS.







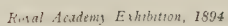
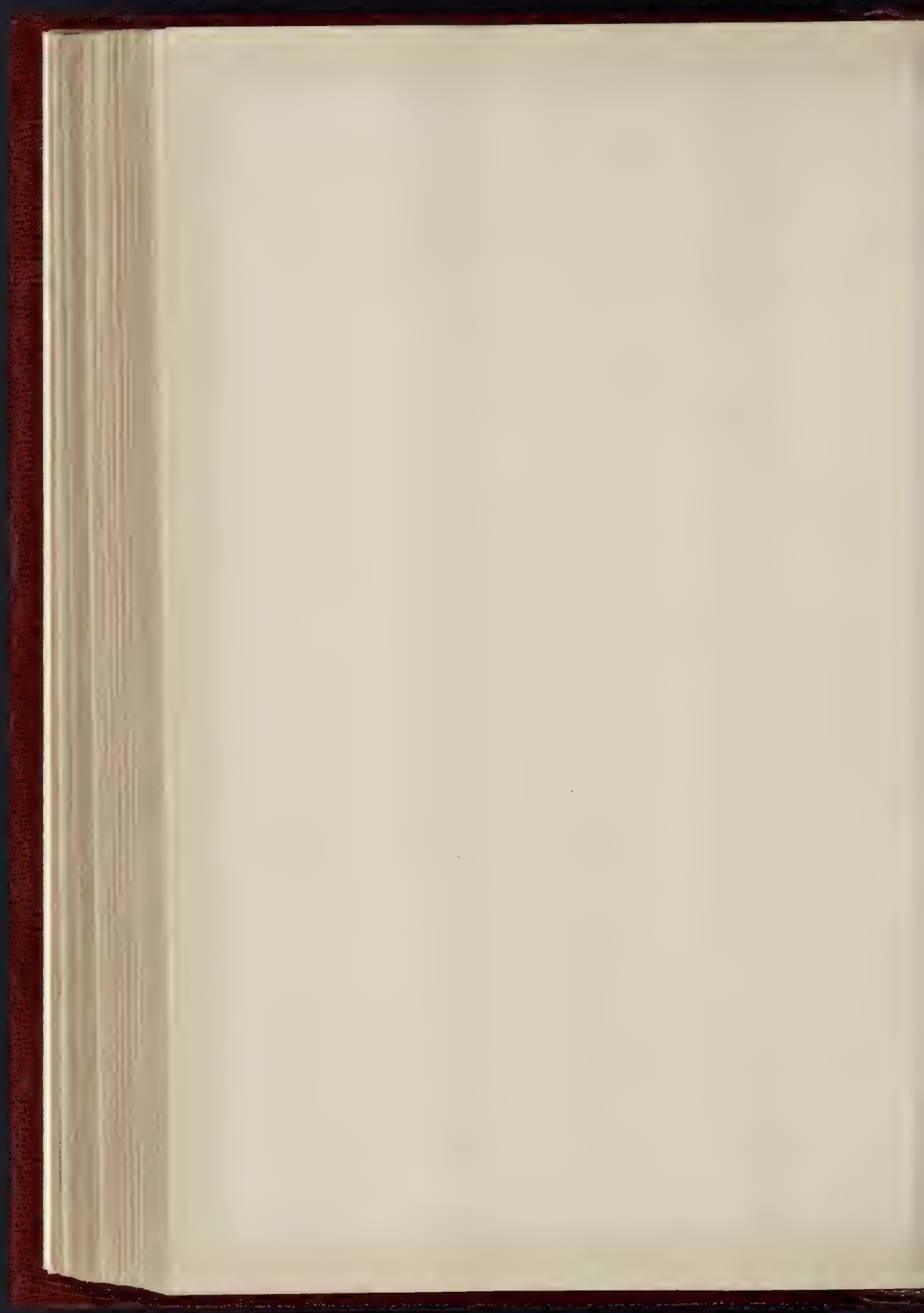






PHOTO BY J. H. BARTLETT & CO. 46 EAST MARCH STREET, LONDON AND E.C.



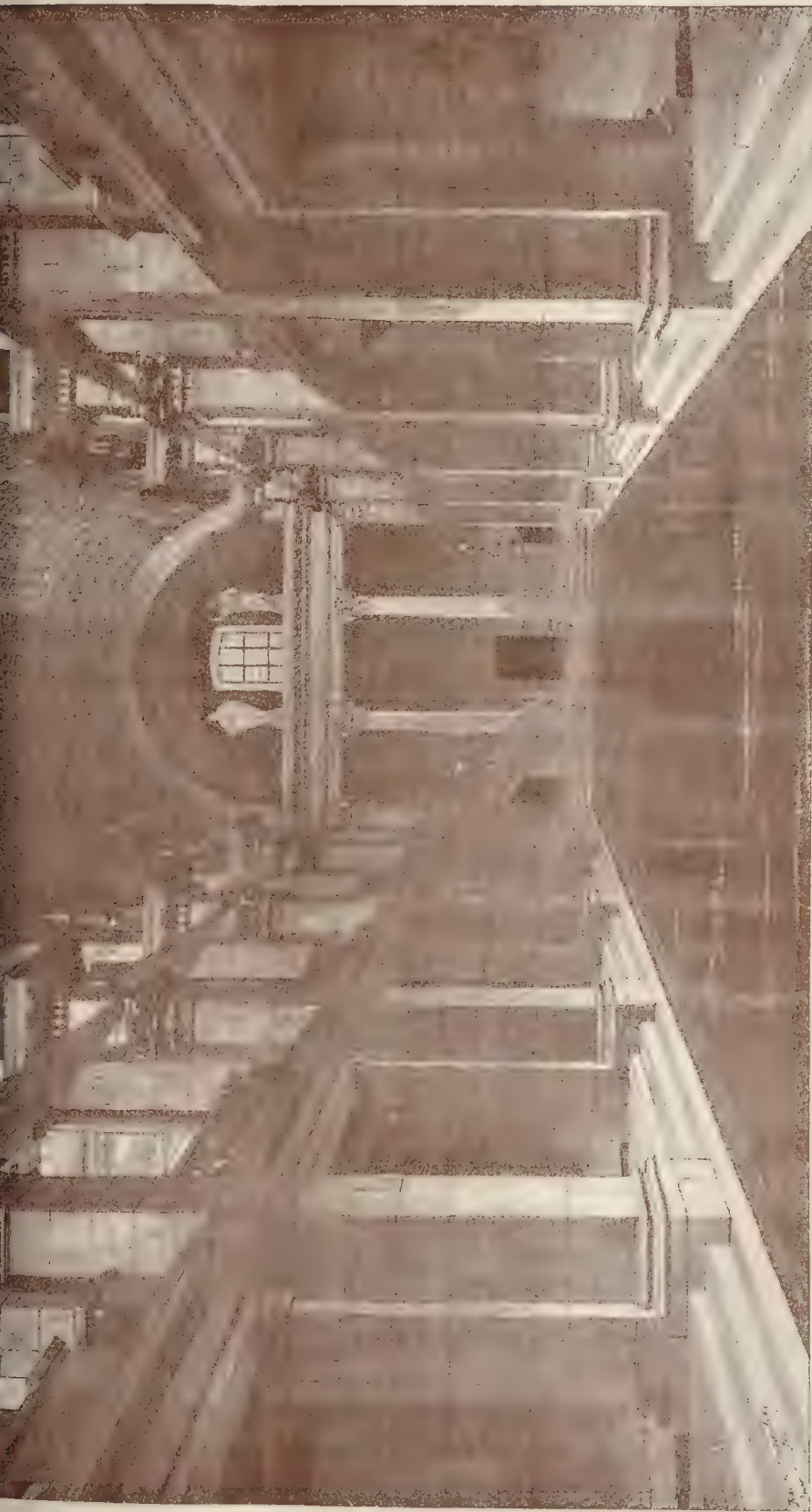




THE BUILDER, OCTOBER 20, 1904.







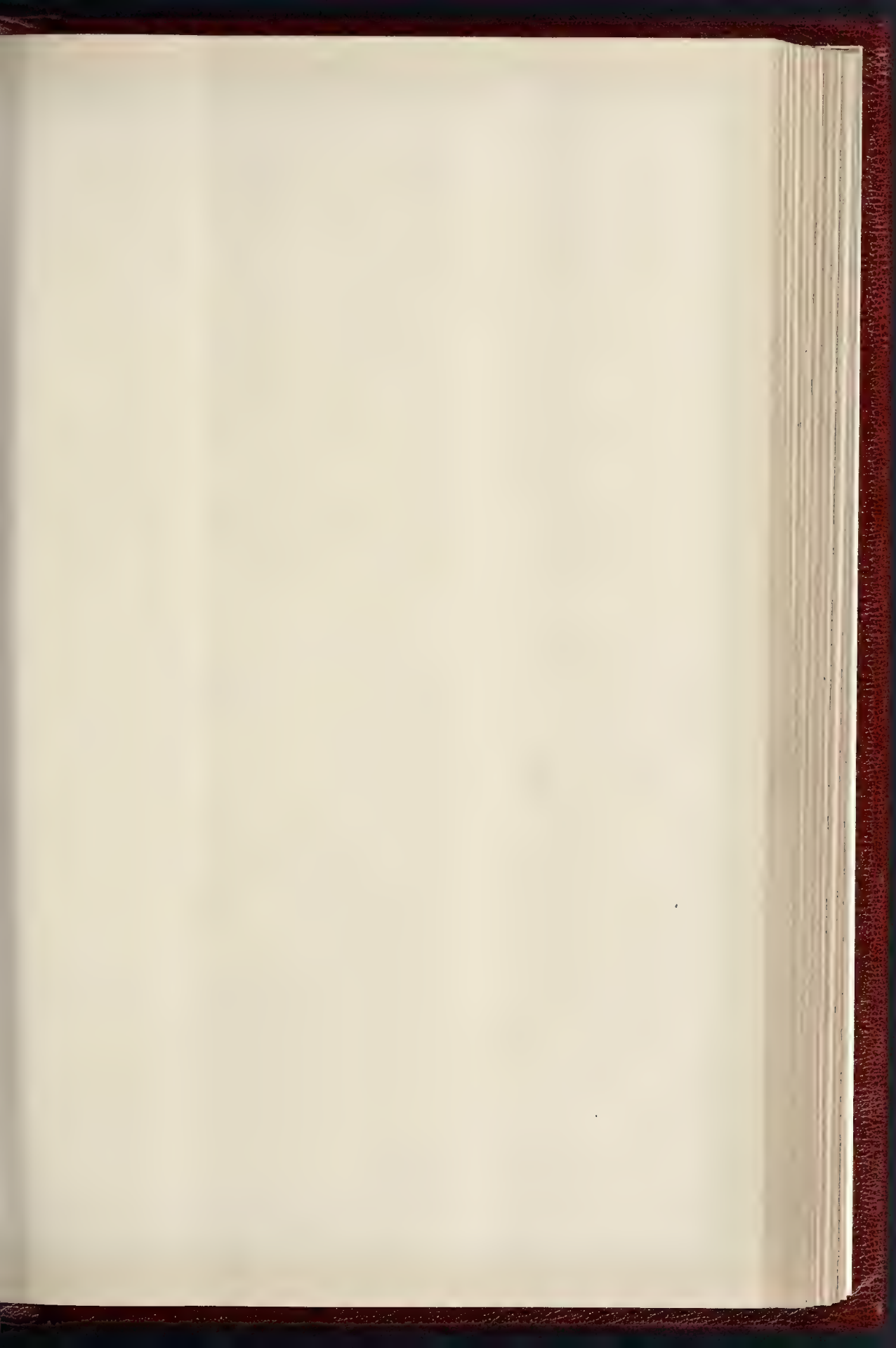
THE GREAT ROMAN BATH AT BATH

SCHEMATIC FOR COVERING, IN THE GREAT ROMAN BATH AT BATH — BY MESSRS. BAGGALLAY & BRISTOWE

*Rev. Architectural Exhibition 1894*









· SOUTH · ELEVATION ·



· SECTION THRU' HALL ·



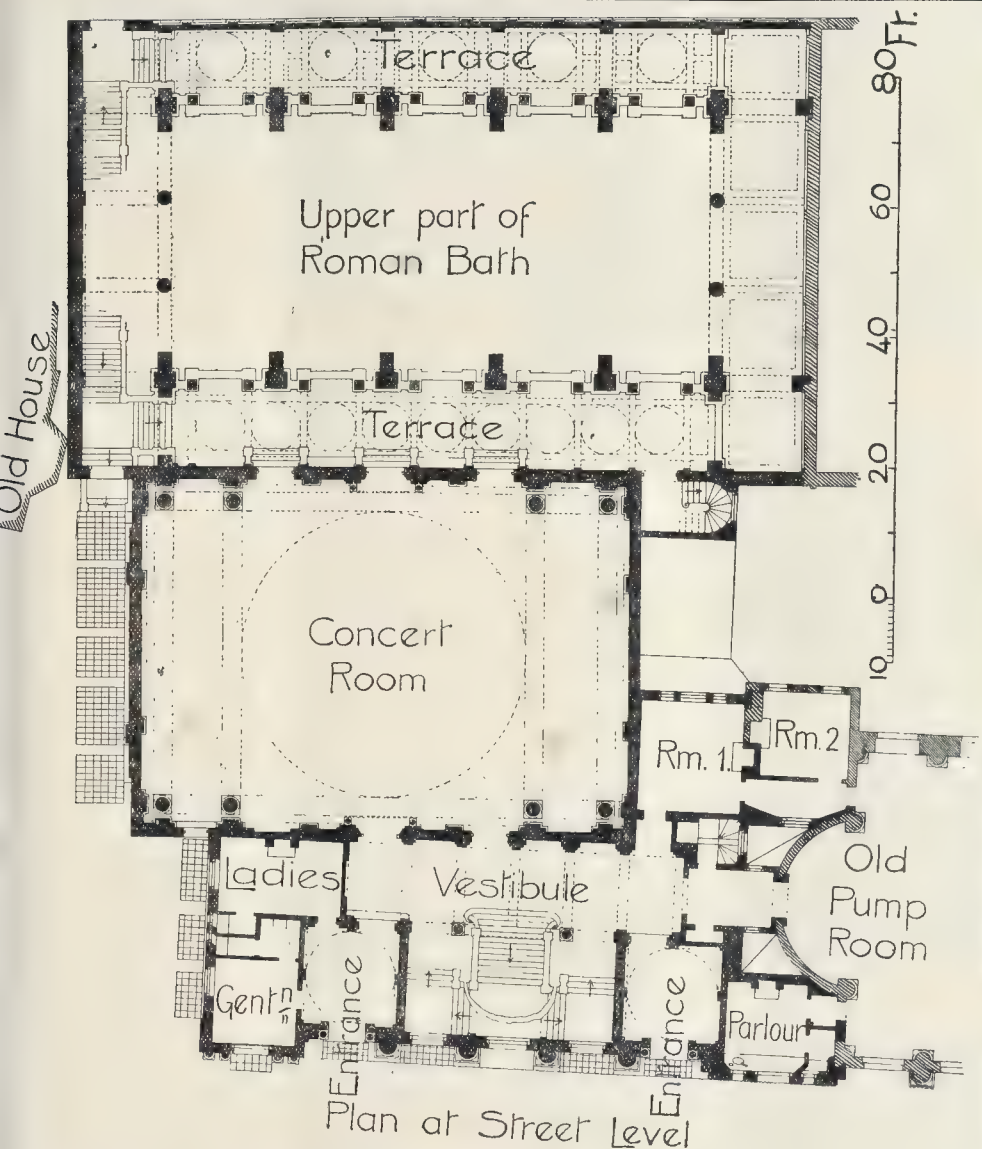




WEST · ELEVATION







Plan of Design by Messrs. Baggallay & Bristowe for Treatment of the Roman Bath at Bath, and the proposed new Buildings.

ated, but Messrs. Baggallay & Bristowe are welcome to their say on the matter, and we made out a very good case from their point of view. We give the plans of their design for the treatment of the bath and the adjoining buildings, which obtained the third premium in competition, and which under the circumstances (which most of our readers will remember) our opinion had the legitimate claim to the second premium.—EJ).

#### MORROWSTONE LODGE, SCOTLAND.

This design was made for a house on a steep side, with a magnificent view up Deeside, which explains the large gazebo in the roof. Part of an older house has been incorporated in the design; the circular room to the left of the dance hall and the room to the right retaining old walls; the rest is new.

The materials intended are local grey granite and dressings, with rough-cast for the chimneys and small grey slates for the roof.

Mr. Reginald Blomfield, M.A., is the architect.

#### DESIGN FOR PUBLIC LIBRARY AND TECHNICAL SCHOOL, ST. HELEN'S.

This design was made for a competition held in the summer of last year. The general character of the proposed building, its position, and the sum to be spent on it, account largely for the simple lines and grouping of the design.

GERALD C. HORSLEY.

#### DESIGN FOR FRIEZES.

The upper and larger of these designs, by Mr. Paton Wilson, was intended for a hunting-lodge, and designed specially to repeat round a room. It would be painted in oil.

The other design, by Mr. E. M. Atkins, is intended for a boudoir or morning-room, it being a conventional treatment of the crocus, emblematical of the "awakening of spring." The colouring (in the original drawing) is kept soft and subdued, being in tints of cream, buff, russet, sage-greens, and flesh, executed in oils, the whole having a mellow dull effect (unglazed).

#### Correspondence.

To the Editor of THE BUILDER.

#### THE R.I.B.A. EXAMINATIONS.

SIR,—Probationers preparing for the Intermediate Examination will have read, if not with entire satisfaction, certainly with none but feelings of gratitude towards the writer, the letter by "A.R.I.B.A." in last week's *Builder*, calling attention to the somewhat irregular manner in which Instructions to Students are issued by the Institute.

Hitherto, no doubt, these instructions have been regarded, at least in so far as the testimonies of study were concerned, as being unchangeable, like the "laws of the Medes and Persians," and it is a serious matter for any student to learn at the last moment that alterations in the syllabus, of which no official intimation has reached him, necessitate the preparation of fresh drawings. I know a case where the particular sheet your correspondent calls attention to is nearly completed, according to instructions published in the *Kalendar*, and would, perhaps, but for "A.R.I.B.A.'s" letter, have been submitted to the Institute, and just possibly have disqualified the

candidate for examination. The instructions referring to this drawing, as given in the Kalendar for 1891-92, and in "The Examinations" for 1893-94, read thus:—"One sheet showing . . . at least three varieties each of timber floors and of combined iron and timber floors," but on the application form dated 11.1.94, which "A.R.I.B.A." mentions, they read thus:—"One sheet showing . . . at least two varieties of each of the following floors—viz., framed-floor, combined iron and timber, and fire-resisting."

The "ambiguous terms" alluded to by "A.R.I.B.A." (some of which are considerably modified in the instructions on the application form already quoted from), cannot fail to perplex a student, and, should he apply to the Institute for guidance, he will most likely be told, as I was, that "the interpretation of the instructions is left to the discretion of the candidate."

Probationers presenting themselves for the forthcoming examinations should send early for application forms, allowing sufficient time for amending drawings to comply with any new regulations the authorities at Conduit-street may think it advantageous to make.

A PERPLEXED PROBATIONER.

#### FIBROUS PLASTERERS' PROTECTIVE ASSOCIATION.

SIR,—I should like to draw the attention of the readers of your journal to the latest act of tyranny and coercion on the part of the organising secretary of the National Association of Operative Plasterers to the members of the above registered trade society. Finding himself beaten at every other point, he has at last induced the Building Trades' Federation to withdraw all the federated workmen from Messrs. Colls & Co.'s job, the Pavilion Theatre, Whitechapel, in the hope that by so doing he will drive us into joining his society or leaving the trade altogether. As we intend to do neither the one nor the other, he may find to his cost that we also hope to obtain the support of those men, both employers and workmen, who do not believe in the federation ticket, and consider that the mechanic or labourer in the building trade has every right, both human and divine, to work for his living at his trade or calling without fear or favour.

As a society formed on protective lines, yet conforming in every way with their arrangements when working on jobs where federated and other men have been employed, and having successfully held our own in spite of slanderous and misleading statements, which have been refuted in both the Radical and Conservative Press, it seems very hard that we should be so persistently misunderstood. The pretext for this, their latest aggression, is that we are working for Messrs. S. Wight & Co., fibrous plasterers, of Crown Works, Amherst-road, Hackney, who had the misfortune to incur their displeasure (in that case through misrepresentation) some two years ago, and as some of our members who were then working for, and were well satisfied with their treatment by, that firm would not leave their work at the dictation of the official of a union they were not members of, and did not believe in, they have been persecuted in every way that can be conceived.

E. MASKALL,  
Sec. Fibrous and Solid Plasterers' Protective Association.

#### SCREENING OF HEATED FLUES.

SIR,—Will any of your numerous correspondents offer suggestions for treating the kitchen flue of an hotel, running up five stories, which becomes so heated as to make the rooms en route unpleasantly hot, besides being a source of danger? Is there a reliable asbestos plaster with which to parge it?

The flue is 13½ in. square, and runs quite vertically for nearly 60 ft. The flue-walls are 4½ inches thick. "FIREPROOF."

#### COLOURING PLANS ON DEEDS.

SIR,—Can any of your readers tell me if there be any chemical to make colour and Indian ink *lie evenly* on parchment?

E. H.  
Water-colours may be made to lie evenly on parchment by mixing them with "Ox-gall," which may be bought of any artist's colourman. Ink is made to run evenly on it by the application of "ponce," a powder procured from law stationers. —E.D.

#### A QUESTION OF FIRE-BRICKS.

SIR,—Among your numerous readers is there one who can inform us who the manufacturers of a fire-brick marked "M. T. & Co." are? If you would allow us to put this question in your columns you would oblige.

A. P.

PARTNERSHIP.—Mr. R. S. Griffiths, of Tonymandy, and Mr. D. Pugh Jones, of Llanelly, architects and surveyors, have commenced business in partnership, this week, having opened a new office at Pontypridd. The business at Tonymandy will be carried on as before.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XVI.

#### THE PURIFICATION OF WATER-FILTRATION.

THE methods of "purifying" or rendering water suitable for domestic consumption are aëration, subsidence, precipitation, straining, and filtration.

Aëration is a natural process of oxidation, the atmosphere acting on matter in solution, this action being facilitated by forming cascades and fountains to agitate and break up the water into thin sheets and spray. This method is employed by the West Gloucester Water Company at Frampton Cotterill to get rid of the large amount of dissolved sulphuretted hydrogen contained in the water, which by this means is rendered bright and palatable. Exposure to the atmosphere has the effect of softening hard waters by releasing the loosely-combined carbonic acid and precipitating the carbonate of lime, but in such cases there is great liability to develop vegetable growth. The beneficial effects of aëration through the use of fountain inlets in destroying algae have been proved—in two instances with remarkable results. The action of the atmosphere on running streams in rivers and channels is well known, the organic impurities being brought in contact with the oxygen of the atmosphere, and gradually oxidised and rendered innocuous.

Subsidence is a process of settlement or gravitation of matter held in suspension, its rapidity depending on the specific gravity or fineness of the matter to be deposited. This action is continually proceeding in storage reservoirs to a greater or less extent, according to the condition of the water, as well as in the settling ponds, residuum lodges and shallow reservoirs, which are specially adapted for the purpose, and are usually a preparatory stage for filtration.

Precipitation of certain impurities is produced by the addition of a precipitant, the most economical being caustic lime. A certain quantity of lime is added to a measured quantity of water in a tank, forming what is known as lime water; the clear liquid is drawn off by a float-pipe into another tank, and the water to be softened is added to it, the action being as follows:—The caustic lime combines with the loosely-combined carbonic acid in the water, forming carbonate of lime, which is precipitated along with the carbonates already in solution. The lime process was patented by Dr. Thomas Clarke, of Aberdeen, in 1841, and all the more recent methods are based on this principle. It has been successfully applied in several waterworks, both for domestic and manufacturing purposes, and among the towns using one or more of the recent methods may be mentioned Colne Valley, Southampton, Wellingboro, Saffron Walden, St. Helen's, and Stroud. The cost of softening, the extent of removing from ten to twenty-four degrees of hardness, varies from 3d. to 3½d. per 1,000 gallons. The hardness of water is stated in degrees, each degree representing one grain of carbonate of lime per gallon, and is found by noting the quantity of standard soap solution required to produce a permanent lather in a gallon of the water. The composition of clear lime-water being constant it is found that if the degrees of hardness are divided into 130 it will approximately give the number of gallons of the water which can be softened by one gallon of lime-water. The above process has the great advantage of destroying organic matter and producing a bright effluent. The following table gives the hardness of water in a large number of towns:—

Name of Town.	Degrees of hardness.	Name of Town.	Degrees of hardness.
Glasgow (Loch Katrine) . . . . .	0.8	Nottingham . . . . .	12.60
Manchester (Thirlmere) . . . . .	1.5	Newcastle-on-Tyne . . . . .	14.00
Sheffield . . . . .	1.5	Reading . . . . .	14.50
Lake Vyrnwy . . . . .	3.15	St. Helen's . . . . .	15.00
Bournemouth . . . . .	3.28	Northampton . . . . .	15.47
Worcester . . . . .	4.70	London . . . . .	16.00
Lowestoft . . . . .	8.65	Portsmouth . . . . .	16.00
Newport (Mon.) . . . . .	9.00	Canterbury . . . . .	17.00
Cheltenham . . . . .	11.36	Stroud . . . . .	17.00
Yarmouth . . . . .	12.60	Windsor . . . . .	17.89
Bristol . . . . .	13.40	Southport . . . . .	17.90
Northwich . . . . .	13.60	York . . . . .	18.00
		Southampton . . . . .	18.00
		Sunderland . . . . .	24.00
		Wellingboro . . . . .	37.00

The commercial and domestic economic advantages which a soft water possesses over a hard one are indisputable. The late Mr. Thomas Hawkesley in recent evidence, however, stated that the death-rates for ten years, from 1882 to 1891, in

twenty-seven large towns supplied with hard and soft water were:—Hard water supply, 20.2 per 1,000 persons; and soft water supply, 23.0 per 1,000 persons = 13.9 per cent. excess over hard water supplies.

Straining—e.g., through screens of brass or copper set in wooden frames—is absolutely necessary in all reservoirs. The screens intercept all floating and suspended matter larger than the mesh. They are removed from time to time for cleansing, which is usually performed by the application of a jet of water from a hose-pipe.

The principle of filtration through sand, for the purpose of removing matters held in suspension, is often imperfectly apprehended, the popular idea being that the sand simply acts as a sieve, and prevents the passage of any particles larger than the interstices between the grains, at the same time allowing a certain amount of subsidence to take place upon the upper surfaces. The sand, however, does much more than this—the main action being due to the force of adhesion or mutual attraction between the particles in suspension and the whole surfaces of the grains of sand, and not the top surfaces only, as would be the case if the action were merely that of subsidence. It has also an effect, although small, on matters in solution, which is illustrated by the following analysis, by Dr. Percy Frankland, of river water before and after filtration:—

Results of Analyses expressed in part per 100,000.

	Before Filtration.	After Sand-Filtration.
Total solid matters . . . . .	28.40	26.20
Organic Carbon . . . . .	1.23	1.19
" Nitrogen . . . . .	0.25	0.22
Ammonia . . . . .	0.05	0
Nitrogen as Nitrates and Nitrites . . . . .	0.77	0.89
Total Combined Nitrogen . . . . .	1.02	1.11
Chlorine . . . . .	1.6	1.6
Hardness, Temporary . . . . .	11.5	10.9
" Permanent . . . . .	7.1	7.1
" Total . . . . .	18.6	18.0

The fact that chemical analysis showed only a slight improvement in the water after sand-filtration somewhat threw discredit upon sand-filters, and it is only within the last few years, since the methods of Koch and others drew the attention of scientists to the bacteriological examination of water, that the remarkable efficiency attained by properly managed sand-filters in reducing the number of bacteria in water has been recognised. It was found that from 95 to 99 per cent. of the micro-organisms were removed by filtration from the London Water Company's supplies, reducing to a minimum the risk of pathogenic or disease-forming bacteria passing through the filters to the consumer. Dr. Percy Frankland has found that the water supplied to London after filtration contains less bacteria than many lake waters, comparison of which is given as follows:—

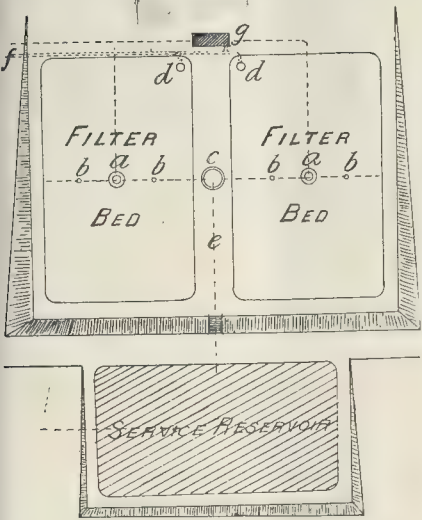
New River (London), 38 colonies from 1 c.c. of water
Grand Junction (London), 47 colonies from 1 c.c. of water
Loch Katrine (Glasgow), 74 colonies from 1 c.c. of water
Loch Lintrathen (Dundee), 161 colonies from 1 c.c. of water
Lake Lucerne (Switzerland), 50 colonies from 1 c.c. of water
Lake Geneva (Switzerland), 38 colonies from 1 c.c. of water
Lake Constance (Switzerland), 58 colonies from 1 c.c. of water

It would therefore appear that too much importance must not be attached to the number of bacteria present in drinking water, within certain limits, provided they are not of a pathogenic nature. The varieties of bacteria are very numerous, but most of these, with the exception of probably a few species, are beneficial rather than otherwise. Amongst the pathogenic bacteria that have been detected in water are the bacilli of tetanus, anthrax, typhoid, and the cholera spirillum. The advantages of sand filtration were strikingly illustrated at Hamburg and Altona during the cholera epidemic in 1892. The cities derive their supply from the river Elbe, the former without filtration, and the latter at a point in the river below the outfall sewers of both cities but properly filtered, with the result that the relative proportion of cholera cases per 10,000 inhabitants was: Hamburg 290, and Altona (of which many were imported cases).

A fact, which is receiving much attention from biologists at the present time, is that a filter-bacterium does not reach its normal state of efficiency, technically "become ripe," until it has been used five or six days; this is believed to be due to the formation on the surface of the sand of



Fig. 37.



- a - Inlet
- b - Ventilating Pipes
- c - Valve Well
- d - Overflow
- e - Filtered Water Main
- f - Overflow Main
- g - Sand Washer

Fig. 36.

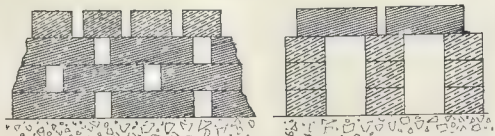
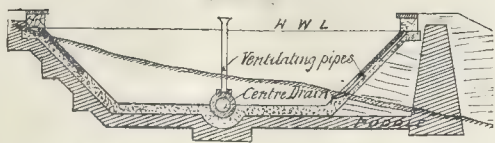


Fig. 38.



Fig. 39.

Fig. 41.

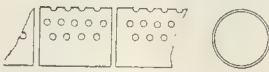


Fig. 40.

relatious microbic tissue (zoogloea) produced by bacteria.

In the design of filter-beds many engineers take advantage of the site when on sloping ground to place the beds at different levels; others prefer to keep one level throughout by excavations and embankments. The area of each bed should be arranged so as to give an equal flow in the drains, but should not be excessive; and the distance or wheeling when the sand is being removed should not be too great. The number of beds should be sufficient to permit of half of them being out of use for cleansing purposes, the supply being maintained through the others. It is found convenient and economical to arrange the sand-washing apparatus in the centre of a battery of filter-beds. In some cases the washing apparatus is fixed in the centre of the bed, as at Belfast, but this arrangement is not generally adopted; another method, which, without doubt, the proper one, is to periodically reverse the filters and allow the water to flow upwards, and thus carry off the impurities through an

overflow. Where this arrangement has been applied, the beds have attained their efficiency within twenty-four hours. The basin of the filter-bed is either constructed partly by means of excavation and embankment, with a puddle-wall lined with concrete (fig. 36), or with concrete walls backed up with earth (fig. 33, Chap. XV.). The floor of the basin is formed so as to dip towards the outlet of the filter, which communicates with a valve well, from which it is conveyed to a clear-water basin (fig. 37). The centre or main drain in the filter-basin is constructed of brickwork, concrete, or perforated glazed pipes, and the side or arterial drains of perforated pipes or bricks laid dry with spaced joints (figs. 38, 39, 40, 41). Ventilating pipes are carried up the slopes or side walls above the water-level from each of the arterial drains, and from 2 to 4 on the line of main drain. The inlet is arranged in various ways; fig. 42 shows an arrangement that has been adopted with great success.

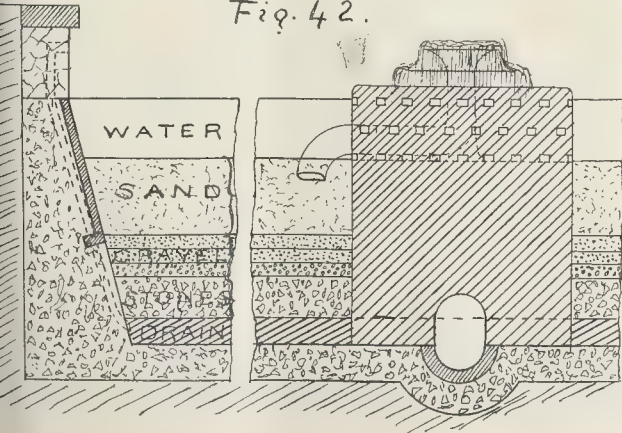
The bed is formed of a layer of stone broken to pass through a 3/4-in. ring, but not through a

2 1/2-in. ring, and from 2 ft. to 3 ft. in thickness; this is succeeded by a layer of gravel 12 in. to 18 in. thick in two or three degrees of fineness; in some cases perforated tiles are used in preference; finally, the filtering medium of sand is spread over the whole of the supporting material (fig. 45), the thickness varying at different works as shown in the following table:—

Thickness of Sand-Filters.

	Maximum.	Minimum.
	ft. in.	ft. in.
Chelsea, London.....	4 6	3 6
West Middlesex, London .....	3 3	2 6
Southwark, London .....	3 0	1 6
Grand Junction, London .....	2 0	1 3
Lambeth, London .....	3 0	2 0
New River, London .....	2 3	1 5
East London, London .....	2 0	1 4
Dublin .....	2 6	1 0
Bristol .....	2 0	1 0
Malvern .....	2 6	1 6
Harrogate .....	2 0	1 0
Paisley .....	2 0	1 0
Barrow-in-Furness .....	2 0	1 0
Ulverston .....	2 0	1 0

Fig. 42.



Dr. Sims Woodhead, who has devoted considerable attention to the subject, suggests a minimum thickness of 3 ft. The sand for filtration should be hard and angular and thoroughly washed, as well as the supporting material, before being deposited in the filter-basin. The rate of filtration should not exceed 5 in. per hour, or 2 1/2 gals. per hour per square foot. The mean rate of filtration in the London filters is less than 2 1/2 gals. per hour. The depth of water in a filter-bed in this country is usually from 2 ft. to 3 ft., and from 4 ft. to 7 ft. where exposed to very low temperature, unless the beds are covered over. The process of cleansing the filter-bed, where downward pressure only can be resorted to, is to remove a thin layer of sand 1/2 in. or more in thickness, containing the perceptible suspended matter, and, if the sand is costly and has to be washed again for future use, deposit it near the sand-washing apparatus, otherwise it is removed into a waste heap. The surface thus bared by the above process is raked over with a long pronged rake on two or three occasions, allowing a few days to elapse between each operation to aerate the sand.

The cost of constructing sand-filters per square yard varies from 1/. to 4/., according to circum-



stances, and the cost of filtration, exclusive of capital, is from 4s. 6d. to 7s. per million gallons. "Magnetic carbide, spongy iron," "Polarite," and other media have been applied with beneficial results to the treatment of impure waters, producing a bright and pure effluent; and, in fact, with river waters the results fully justify the increased expenditure through their use. Mechanical filters, such as Dr. Anderson's Revolving Cylinders, in a few cases where they have been employed have given satisfactory results.

#### OBITUARY.

MR. J. L. ROBINSON.—We regret to have to record the death of Mr. J. L. Robinson, R.H.A., architect, of Dublin. His death, from typhoid, occurred on the 12th. Mr. Robinson was well known to many architects in London and elsewhere in England, from his regular attendance at the annual excursions of the Architectural Association. He had paid great attention to architectural photography, and generally produced, during the excursions, a number of photographs in illustration of the places visited. His loss will be regretted by many friends in the profession.

MR. CHARLES HERBERT COOPER.—We record with regret the death of Mr. Charles Herbert Cooper, A.R.I.B.A., late of Great College-street, Westminster. This young architect has been struck down by typhoid fever at the early age of thirty-two. He received his early education at Kensington School, and from thence entered the architectural school of the Science and Art Department, where he was a distinguished pupil. He was afterwards articled to Mr. Rowland Plunbe, in whose office he worked for some years. Mr. Cooper subsequently was for four years in the office of Messrs. Somers Clarke & Micklethwaite, and had during the last two years of his life been in practice in Westminster. He was a man of a singularly gentle and retiring nature, and only to his more intimate friends revealed the culture and wide learning which were peculiarly his own. Mr. Cooper was engaged at the time of his death in collecting and editing particulars of the places of burial of distinguished Englishmen and women.

#### GENERAL BUILDING NEWS.

CHANCEL, ST. MICHAEL'S, CAMDEN TOWN.—On the 13th inst. the new chancel at St. Michael's church, Camden Town, was consecrated. The additions which have been made to the church consist of the chancel, south aisle, and chapel. The chancel is in harmony with the nave and aisles. Its general dimensions are: 48 ft. long, 25 ft. wide, and 59 ft. high to the apex of the roof. The original design had to be modified considerably from want of funds, the chancel being shortened, the wooden wagon roof being substituted for a vaulted stone roof, and a simpler east window taking the place of the original design. On the north side, divided off by stone tracery screens is a simple low stone vaulted chapel, called the Chapel of the Resurrection. The vestries still remain to be built, and the stone tracery has been omitted from the south screen, on account of expense. A panelling of wood, painted dark olive green, has been added; the walls of the nave have been plastered, and a warming apparatus has been put in. The roof has been decorated by painting three bands of scroll-work in each bay, and the aisles have been painted in red, with the sacred monogram in black and white. An inscription runs round the roof. The panelling and canopy behind the altar is painted and gilded. The church has been erected from the designs of Messrs. Bodley & Garner, of Gray's Inn Square, the builders being Messrs. Stephens & Bastow, of Bristol, with the assistance of their foreman, Mr. Hampton.

NEW BREWERY, DARLINGTON.—A large brewery erected in Haughton-road, Darlington, from designs by Messrs. G. Dickenson & Son, architects, was opened on the 11th inst. It is supplied by water from an artesian well on the premises, 260 ft. in depth, sunk by Messrs. Tustin & Sons, of Runcorn. The contractors for the various works were:—Building, Mr. G. Marshall; joinery, Mr. R. T. Smith; plumbing, Mr. Emmerson Smith; painting, Mr. T. Metcalfe; iron-work, Mr. J. Dobbing, all of Darlington; and slating, by Mr. Mascall, of Middlesbrough.

FREE LIBRARY, SPOTLAND, CARDIFF.—The Spottland Branch Library, situated in Moorland-gardens, was opened on the 16th inst. by Lord Tredegar, who is the donor of the site, and also of the gardens, which are 420 ft. long and 155 ft. wide. The building is 67 ft. long and 35 ft. wide. The style of architecture is Late Gothic. The library contains a large reading-room, a lending-library, with librarian's room, store, and lavatories, together with a shelter for the caretaker of the gardens. The building is of Newbridge stone, with Bath stone dressings. The roof is slated, and the turret covered with lead. The architects are Messrs. Habersham & Fawcner, and the builder, Mr. Henry Davies, Cardiff. As at present arranged, the reading-room will accommodate about eighty readers, and there is room for increasing the accommodation. The

building contains book storage for a library of 10,000 volumes.

IMPROVEMENTS AT THE HOUSES OF PARLIAMENT.—According to the *Times*, a series of alterations, involving a total expenditure of 14,000*l.*, has during the recess been in active progress within the Houses of Parliament, no fewer than 140 men being engaged upon the work. An addition to the space available for kitchen purposes is now being made by extending the ground floor at the point into the Commons Inner Court. A servants' hall will there be provided, together with manager's room, cigar and wine stores, and a waiters' dressing-room. New wine despatch cellars will take the place of the old lift-room, and a new staircase for the use of the staff will ascend from the kitchen to the dining-room floor. A kitchen 40 ft. long is being constructed by the absorption of the room previously occupied by Dr. Percy, and the ceiling is covered with cement, to prevent the possibility of any smell ascending. Immediately adjoining the kitchen will be the lower service-room, from which four hydraulic lifts will rise to the level of the members' dining-rooms. At the opposite end of the kitchen will be a pastry-room and a separate room for the chef. The members' principal dining-room is being restored. The projection formed by the old wine-bar has been removed, and in future the wine will be served from a similar room under the groined arch seen from the lower waiting-hall. The grill has also been taken down and re-erected in a large general service-room, located between the large dining-room and a new dining-room secured by the conversion of the old smoking-room. All the four lifts will enter the general service-room, and the apartment is being fitted with kitchen and conveniences incidental to efficient dining arrangements. No structural alteration will be made in the dining-room reserved for Ministers, but double window-frames are being affixed in each of the three dining-rooms, and the entire suite will be re-decorated. Alterations are also being carried out at the foot of the staircase leading from the committee corridor to the reading-room, and to Ministers' private rooms. The two small dining-rooms which there existed have been abandoned, and the space will be set apart to provide dressing-room accommodation and a hair-dressing saloon. There will be seven cubicles. As a further convenience, baths are for the first time being introduced. The old bake-house has been utilised, and four private baths are being erected in rooms of the most approved type. Equivalent dining accommodation for members who desire to introduce strangers will be provided by the conversion of two of the Ministers' rooms adjoining the main terrace dining-rooms and of the terrace reading-room, with the result that there will be a net gain of thirty seats in the new arrangement. Among other minor changes will be a slight enlargement of the post-office in the members' lobby, which will give, under the staircase leading to the Peers' Gallery, in the House of Commons, a certain amount of additional window space. The public admitted to the seats below the gallery will retain their places during divisions, and a light handrail will prevent the possibility of any intrusion upon the precincts of the House. Electrical communication will be established between the Chamber, the library, and the smoking-rooms, and the division-bells will be extended to the Grand Committee-rooms in Westminster Hall. The improvements in connexion with the Press gallery include the construction of two new entrances, in place of the one formerly existing in the ceiling of the kitchen by the absorption of the tea-room; the acquisition as a new tea and reading room of that formerly occupied by Colonel Legge, the assistant Sergeant-at-Arms; and the construction of a "copy" carrier from the gallery to the junior messengers' room in the Star Chamber. The work is being carried out under the direction of Mr. John Taylor, the chief surveyor of Her Majesty's Offices of Works, with the assistance of Mr. Jones, the clerk of the works, and Mr. Prim, the resident engineer.

TOWN HALL BUILDINGS, NORTH SHIELDS.—The alterations and additions to the Town Hall and Police Buildings, North Shields, are now all but complete. The object of the alterations was to so arrange the offices that the whole of the Corporation work should be located in one building as far as possible. The shell of the building remains almost unchanged, the only alteration being the construction of a door in the front part of the building, in order to keep the entrances to the Police Station apart; the addition of a few windows to lighten up the charge-rooms, and the taking in of a portion of the old Post Office in Howard-street to make provision for the rate collectors, Borough Accountant, Borough Surveyor, &c. A good deal of attention has been devoted to all the accommodation. Under the old plan there were only four cells, and the alterations consist in taking down the whole of two blocks of four each. The cells and corridors are lined with white glazed bricks to a height of 7 ft. above the floor, with adamant cement above the level. The cells are fitted with Shanks' Self-acting Combination Closets. A separate entrance has been provided for the Police Station. The ground floor, which was formerly three or four steps above the street level, has been brought down to

within 6 in. of the footpath, and the charge-rooms, cells, inspectors' and detectives' offices are all upon one level. The Chief Constable's office has not been interfered with. It occupies a prominent corner of the block, and is also on the ground floor, though a few feet above the level. A portion of the old post-office in Howard-street is now set apart for the rate-collectors, who have been provided with an office on the ground floor. On the opposite side of the same floor, also entered from Howard-street, where the County Court Offices formerly were, the Surveyor and his assistants. On the first floor, over one block of cells, there is now a committee-room. By an alteration in the principal staircase the council-chamber has now a separate entrance from the police-station. Over the other block of cells there is a magistrate's parlour and lavatory. The floor of the council-chamber has been raised, so that the whole of the first floor is upon one level, and each room has a separate entrance. The works have been carried out by the designs of Mr. J. F. Smillie, the Borough Surveyor, by Messrs. Johnson & Son, contractors, North Shields; and the painting work has been entrusted to Messrs. S. Park & Son, of the same town. The interior of the Town Hall has been altogether remodelled, and the new furnishing it has been carried out by Mr. Herbert Read, of St. Sidwell's Art Works, Exeter. The furniture consists of benches of carved oak for the Aldermen and Councillors, the Aldermanic bench, with the Mayor's seat in the centre, being slightly raised. The design of these is simple, but in very good taste. The accommodation for the Press is very much improved. The floor is covered with terra-cotta cork carpet, supplied by Messrs. D. Hill & Co.

ALTERATIONS TO WESLEYAN CHAPEL, CUBERT, CORNWALL.—After alterations, the Wesleyan Chapel at Cubert has been re-opened. The scheme included a new Sunday-school adjoining the chapel and communicating with it, the former school having been situated under the gallery, both of which have been removed and the space thrown into the chapel. The chapel has had a new ceiling, and all the old joinery has been replaced by modern pitch-pine pews and rostrum, Communion furniture, lobby screen, and stairs to the gallery. The rostrum is of pitch-pine and polished mahogany. All the stencils, and the preparation of plans, specifications, and supervision of the work was entrusted to Mr. Sampson Hill, architect, of Redruth, and the contract has been carried out by Messrs. T. H. Rodliff and S. Chynoweth, carpenters, and Mr. R. H. George, mason, all at Cubert.

INFIRMARY, ISLEWORTH, MIDDLESEX.—The Infirmary to the Isleworth Union will comprise 120 beds about 70 ft. long by 24 ft. span. Mr. W. H. Ward, of Birmingham, is the architect. The whole of the floors will be fireproof, on the Fawcett System. The smoke-flues will be carried in the thickness of the floor.

#### SANITARY AND ENGINEERING NEWS.

NIAGARA WATER POWER.—The Niagara water-power undertaking, the first portion of which is to be thrown open before the end of this month, comprises the construction of a canal, a wheel-pit, and a tunnel under Niagara City, besides the execution of sundry other schemes. The total water-power of the Falls is estimated at 7,000,000 horse-power, of which the Niagara Falls Power Company proposes to utilise at present only the comparatively small medium of 125,000 horse-power. The main canal leading from the river is protected against floating ice by having its entrance directed down stream, as well as by a floating boom fastened to iron piers at its mouth. The canal is 1,300 ft. long, from 100 ft. to 130 ft. wide, the depth of water averaging 12 ft. The greatest velocity of flow in the canal will be 4.77 ft. per second, when a sufficient amount of water will be fed to the turbines to produce 100,000 horse-power. From this inlet canal the water is led through steel penstocks to the turbines, and is discharged into a channel at the bottom of the wheel-pit, from which it flows into the main tunnel, and is returned to Niagara River at the wheel-pit (cut into the solid rock) is 178 ft. deep, 22 ft. wide, and at present is 140 ft. long. When it is continued to its full length as planned, it will provide for ten inlets, and be about 400 ft. long. The work of construction was completed by the contractors, Messrs. Rogers & Clement, of New York, on October 4, 1893. The heading between the portal and shaft No. 1 met on December 21, 1893, and that between shafts No. 1 and No. 2 on February 3, 1894. In blasting for the tunnel eight hundred tons of dynamite were used, and thirty acres of land (intended for docks) were made available by material excavated. The tunnel is lined throughout with vitrified brick, 13,000,000 of them being used. It is 7,250 ft. long, from 14 ft. to 18 ft. wide, and 8 ft. high. The fall is 36 ft. to the mile, and the tunnel passes 200 ft. below the City of Niagara Falls. Three turbines of 5,000 horse-power each are in position, and the dynamos ready to be placed. A concrete subway, 5 ft. 6 in. by 2 ft. 6 in., is ready to receive the wires, which are to supply 6,000 electrical horse-power to the Pittsburgh Reduction Works, and thence by poles to Buffalo. The Niagara Falls Power Company has acquired



600 acres of land, stretching to a point five miles easterly and three miles northerly from the Falls of this area, 1,071 acres are intended to be used for mill sites for manufactories. The Niagara Development Company—an offshoot of the parent company, which is to erect dwellings for the operatives employed—has purchased 340 acres of land, eighty-three acres of which are already occupied by houses, shops, a school, and streets, the whole district being provided with water and a double system of sewers leading to sewage disposal works. The Niagara Junction Railway Company—another sub-company—has acquired 168 acres of land, and has completed a terminal railway connecting the Power Company's lands with the existing railways at Niagara Falls. The Power Company has its lands under water sufficient to provide an uninterrupted dockage front of 12,000 ft. Some of the docks have already been made.

**OSSETT SEWAGE.**—At the last meeting of the Asset Town Council, it was resolved to ask Mr. Malcolm Paterson, of Bradford, to report upon the best method of dealing with the sewage at the two outfall works. Mr. Paterson was the engineer who, nearly twenty years ago carried out these works, along with the main drainage of the district. An application has been recently made to the Local Government Board for borrowing powers for some additions to the works. Their inspector, however, reported that the sewage was being merely treated at the time, the land filtration having been discontinued. Consequently, the sanction to the loan was withheld, and the Council were requested to submit comprehensive proposals for the improvement of the works. The sewage is one of the very worst in the kingdom, being largely woollen trade refuse of a most changeful and refractory kind.

**WATER SUPPLY, WOTTON-UNDER-EDGE.**—On the 8th inst. water-supply works were opened at Wotton-under-Edge. Mr. A. P. I. Cotterell, engineer, of Bristol, prepared the plans for the work, and Mr. Stephen Ambrose, of Bath, entered into a contract to carry out the works, the entire cost amounting to £3,200. Mr. Butler was the resident engineer and clerk of the works. The water is conveyed from Hamlin Brake in cast-iron 4-in. mains to reservoir of concrete capable of holding 90,000 gals., the site of this service-tank being 200 ft. above the town, and about a mile distant from Wotton. The quantity of water thus stored is calculated to furnish a supply for two and a-half days; it from the service-tank it is conveyed in 4-in. and 6-in. cast-iron pipes through the town. Altogether 15 miles of piping are used. A number of hydrants are fixed throughout the streets in order to make provision against fire. The town is being divided into sections, so that in case of repairs the whole supply might not be interfered with, but the exact liability readily examined.

**WATER AND SEWAGE QUESTION, HENLEY-IN-ARDEEN.**—At Henley-in-Arden recently Colonel C. L. M. R.E. opened an inquiry on behalf of the Local Government Board relative to the application of the Stratford-on-Avon Rural Sanitary Authority sanction to borrow £2,500, for the purposes of a sewer scheme, and £2,145, for a sewage scheme, for the township of Henley-in-Arden. The application regarding the water supply was first discussed, and, after the assistance of plans and maps, Mr. J. E. Cox, C.E., of Birmingham, described the proposed scheme in detail. It was proposed to take water from three springs at Ford Hall, and connect sources in a service reservoir capable of holding 500 gals. The water would be conveyed by gravitation to the town of Henley. Colonel Luard proceeded to the discussion on the sewage question. The engineering details were considered, and the Inspector subsequently visited the source of water supply and site of sewage outfall works.

## PAVED GLASS AND DECORATION.

**MEMORIAL WINDOWS, ST. AUGUSTINE'S CHURCH, HIGHURRY NEW PARK.**—Bishop Barry recently unveiled at St. Augustine's Church, Highurry New Park, a memorial to the memory of the vicar. The memorial takes the form of two stained glass windows and a tablet on the north wall, the chancel within the communion rails. The design is a design in mosaics, resting on a carved base, on which are the arms of the Calthrop family heraldic colouring. Within a gold scroll is a portrait of the deceased, the Rev. G. Calthrop, M.A. The tablet was designed by Mr. J. H. Matthews, and the carving and mosaics are by Mr. Harry Hems, of Exeter, and Messrs. Bell, of Whitefriars.

**MEMORIAL WINDOW, ST. THOMAS'S CHURCH, EXETER.**—On the 10th inst. a stained glass window memorial brass were unveiled by Mr. T. M. W. J.P., at St. Thomas's Church, Exeter, in memory of the late Bishop Medley, D.D., Bishop of Exeter, Metropolitan of Canada. The window is on the north side, near the font, and is of the north-east end of the building; it is made of latton, mounted upon a background of gold and polished dove marble. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

**MEMORIAL WINDOW, WESLEYAN CHAPEL, PENANCE.**—A window has been placed in the Wesleyan Chapel, Penance, in memory of the late Mr. Edwin George John Cunliffe, of that place. "Our Lord Giving Sight to the Blind" is shown in one light, and "Christ Teaching the Multitude at the Sea of Tiberias" in the other. The work was designed and executed by Fournere & Son, of Plymouth.

## FOREIGN AND COLONIAL.

**FRANCE.**—An exhibition of the recent works of M. Puvis de Chavannes has been organised at the Durand Ruel Gallery, and will remain open to the end of the month. Among the works exhibited may be specially mentioned two little pictures, "La Pitié" and "La Charité," a fine pastel, "La Lecture," and two large decorative compositions, "La Rivière" and "Le Cidre."—A monument is to be raised at Courbevoie in honour of citizens, firemen, and police agents who have died in the execution of their duty. The monument consists of a pedestal of grey granite of rather contorted form, with commemorative inscriptions, above which is a pyramid of red granite decorated with a crown of flowers and a palm-leaf in bronze.—The bridge at Puteaux, commenced last April, under the direction of M. Hétiers, the Engineer-in-Chief of the Department, is progressing rapidly, and it is expected that it will be opened in June.—The Minister of Public Instruction has just inaugurated at Toucy (Yonne) a monument to the memory of Pierre Larousse, the compiler of the great "Encyclopédie Universelle." The monument was designed by M. Vaudremer, and comprises a fountain in the form of a stele, from which the water runs into a basin, and which is surmounted by a bust of Larousse in bronze.—In the Jardin de l'Infante at the Louvre, not far from the Raffet monument, the pedestal has been commenced for a monument to Boucher, the painter, designed by M. Aubé.—The Académie des Beaux-Arts has just awarded for the first time the Saintour prize, which has been given to M. Lerche, a former Villa Medici student.

**GERMANY.**—The Emperor was present at the unveiling of the monument to Frederick, the first Elector of Hohenzollern, at Freisack, in the province of Brandenburg. The monument takes the form of a bronze statue by Calandrelli, on a pedestal of Swedish granite, and stands on the spot whence the Elector bombarded the castle of the rebel Baron Quitzw.—The municipality has approved of Professor Siemering's plans for a group of statuary, the main figure of which will be a representation of St. Gertrude, for the new Getrautenbrücke.—Dr. Wallot, the architect of the new Imperial Houses of Parliament, has been elected an honorary member of the Berlin *Architektenverein*, on the occasion of the inspection of the building by that society.—The monumental works of the late archaeologist, Heinrich von Brunn, "Noteworthy Productions of Greek and Roman Sculpture," and "Greek and Roman Portraits," are to be carried on by Dr. Paul Arndt, of Munich.—An Exhibition of the Ancient Arts and Crafts of North Frisia has been opened at Husum.—The Castle of Rammelburg, near Mansfeld, a building dating from the sixteenth century, has been totally destroyed by fire.

Dr. Ziegler has been examining the Roman roads and settlements in Hohenzollern at the instigation of the reigning prince, and an archaeological atlas of the province is shortly to be published. There will be appended a description of the Roman-road from Rottweil to Rottenburg, which Dr. Ziegler assumes to have originally been the "Limes Rhetica."

## MISCELLANEOUS.

**AUSTRIAN SERPENTINE.**—Serpentine, admirably adapted for industrial purposes, and of an oil-green colour, semi-transparent, is found on the Murrumbidgee; at Bingera, county of Murchison; Warialda, county of Burnett; Burraba, Manilla, county of Darling; and Stony Batta, county of Hardinge. Different varieties of red-veined serpentine, steatite, and other similar minerals are reported in the Upper Peel River. It also occurs at Coolac and Jones's Creek, near Gundagai, county of Clarendon, and on the Clarence River. A foliated variety of serpentine occurs on the Murrumbidgee, of a yellowish colour, associated with a dull red and green serpentine rock, and at Cowabie, forty miles from Wagga Wagga, with leaf gold. A fibrous variety of serpentine is found at Kelly's Creek, Gwydir River, and in the serpentine at Bingera, county Murchison, with Meerschaum. It occurs also as a green striated mineral at Lucknow, county Wellington, and Wentworth, near Orange, county Bathurst.—*Australian Notes.*

**PROPERTIES FOR SALE.**—The Flete estate, of about 5,600 acres, lying around the valley of the Erme (which rises in Dartmoor) where, some say, is the finest scenery in South Devon. The manor of Flete, or Fluit, belonged to the Damarells from the Conqueror's time to that of Edward III.; it passed to the Hoiles, and then to the Butlees, of whose mansion there is a view, by W. P. Payne, in R. Polwhele's "Devonshire." That house was rebuilt in the castellated Tudor style, by Mr. Norman

Shaw, R.A. The property comprises the greater part of Holbeton, which belonged, temp. Edward IV., to the Duke of Exeter, who was buried, 1447, in St. Katherine's-by-the-Tower, and whose tomb was removed thence to the Hospital Chapel in Regent's Park; it was granted by Henry VII., in 1487, for her life, to his mother, the Lady Margaret, widow of Edmund Tudor, Earl of Richmond; Stoodleigh Court, in the Exe valley, with 4,300 acres, and a mansion erected after the designs of Messrs. Ernest George & Peto.

**PUBLIC WORKS AT DANTZIG.**—According to a recent report of the British Consul at Dantzig, the harbour of refuge at Hela, in the Gulf of Dantzig, twenty-two miles north of that port is completed, and steamers plying between Dantzig and Hela land their passengers and goods at the West Pier. The basin, which has an area of ten acres, and a depth of 10 ft., is enclosed by two moles, one semicircular and one straight, the opening between being 120 ft. wide. The increased facilities for landing having induced a company to purchase a tract of land at Hela with a view of building villa residences there, and turning the village into a fashionable watering-place.

**LOCK, NEWLAND, GLOUCESTERSHIRE.**—A chiming clock has just been fixed in the church tower at Newland. It has one face looking eastwards, and strikes the hours and chimes the quarters. All the latest improvements have been introduced by the makers, Messrs. John Smith & Sons, of Derby.

**A NEW WORK ON LONDON.**—Messrs. A. C. Black intend to bring out in the autumn of next year a new "Survey of London," describing London and its buildings within the jurisdiction of the London County Council. The work will be illustrated by maps and engravings, and will be edited and in great part written by Mr. Walter Besant. Mr. Besant is a very able literary writer on such subjects, but we should suggest that the co-operation of an architect on such a work is rather desirable. **SURVEYORSHIP APPOINTMENT.**—Mr. Golder, junior assistant in the Borough Surveyors' Department, Folkestone, has been elected Borough Surveyor, Sanitary Inspector, and Inspector of Petroleum at Deal, at a combined salary of 1351. per annum.

## CAPITAL AND LABOUR.

**BUILDING TRADES' EMPLOYMENT DURING SEPTEMBER.**—The *Labour Gazette* states that during the month of September last most branches of the building trades continued to be well employed, though a slight falling off was observable with carpenters and plumbers, with the result that the percentage of unemployed in the unions connected with this group of industries rose from 3.4 to 3.6. During the same month twelve new disputes arose in the building trades and nineteen occurred in mining and quarrying. With reference to London, a slight falling off in the numbers employed in the building trades was observable, 144 branches of three unions, with an aggregate membership of 10,798, returning the 406 (or 3.8 per cent.) as unemployed, compared with 2.8 per cent. in August.

## MEETINGS.

**FRIDAY, OCTOBER 19.**  
*Sanitary Institute.*—Second lecture on "Elementary Physics," by Mr. John Castell-Evans. 8 p.m.

**SATURDAY, OCTOBER 20.**  
*Sanitary Institute (Lectures to Sanitary Officers).*—"Practical demonstration of Examples of Building Construction under By-laws," &c., by Dr. Darra Mair. 8 p.m.

**MONDAY, OCTOBER 22.**  
*Sanitary Institute (Lectures to Sanitary Officers).*—Mr. S. Rideal, D.Sc., on "Elementary Chemistry," I. 8 p.m.  
*Sanitary Inspectors' Association (St. James's Hall).*—Professor Lewis on "The Atmosphere and its Sanitary Relations," I. 7.30 p.m.

**TUESDAY, OCTOBER 23.**  
*University Extension Society (Chelsea Centre: Chelsea Town Hall).*—Mr. Arnold Mitchell on "English Architecture," III. 3 p.m.

**WEDNESDAY, OCTOBER 24.**  
*Carpenters' Hall (Lecture to Students on Sanitation).*—Professor H. Robinson on "Drainage of Buildings and Construction of Sewers," 8 p.m.  
*Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).*—Inspection and Demonstration of the Disinfecting Station at St. Pancras. 3 p.m. Mr. S. Rideal, D.Sc., on "Elementary Chemistry," II. 8 p.m.  
*Institute of Mechanical Engineers.*—Ordinary general meeting. 7.30 p.m.

**THURSDAY, OCTOBER 25.**  
*Institute of Mechanical Engineers.*—Ordinary general meeting (concluded). 7.30 p.m.

**FRIDAY, OCTOBER 26.**  
*Architectural Association.*—Annual General Meeting. (1) Presentation of prizes and medals, (2) Address by the President (Mr. E. W. Mountford). 7.30 p.m.  
*Sanitary Institute (Lectures to Sanitary Officers).*—Dr. R. T. Hewlett on "Elementary Bacteriology," 8 p.m.

**SATURDAY, OCTOBER 27.**  
*Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).*—Inspection of the Aylesbury Dairy Company's Premises, Bayswater.







LONDON.—Accepted for repairs and decorations to "Guilfield,"  
apham Park, S.W. Mr. Herbert Riches, architect, 3, Crooked-  
ne, London, E.C. —  
T. Osborn & Sons, Lower Thames-st. London, E.C. 668.



**L.L.WYNPIA** (South Wales).—For the erection of thirty houses, Penarth, for the Sherwood Building Club. Mr. R. S. Gwynne architect, Tenby. J. Rees, Pontypridd, £545 10 0.  
**Rowland & Igoe** ..... £545 10 0.  
**David Evans & Sons** ..... £545 10 0.

**PORT TALBOT**.—For additions to school buildings, for the Alteration School Board. Messrs. Thomas & James, architects, Poughett, Port Talbot, Wales. £425.  
 J. & S. Rees, Aberystwyth, Port Talbot. Accepted subject to approval of the Education Department.

**RUCKINGE** (Kent).—For the restoration of the Parish Church of St. Mary Magdalene, Ruckinge, Kent, for the Rev. G. Harris. Mr. E. P. Johns Brock, F.S.A., architect. £1,750.  
 R. J. Nightingale ..... £1,750.  
 J. J. Wise ..... £1,750.  
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 T. Coleman ..... £1,500.  
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**STOCKPORT**.—For alterations, &c., to 10 and 11, Lower Hill-gate, for the General Purposes Committee. Mr. John Atkinson, C.E., Borough Surveyor, St. Peter's Gate, Stockport. £1,500.  
 W. C. Broadhurst ..... £1,500.  
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 W. C. Broadhurst ..... £1,500.

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**SWINDON**.—For additions to the "Eagle Tavern," Regent-street, New Swindon, for Mr. H. W. Thomas. Mr. William Drew, architect, Swindon. £1,500.  
 W. Chambers ..... £1,500.  
 T. Barrett ..... £1,500.  
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**SWINDON**.—For new stables and alterations to the "Belle-vue" Inn, Swindon, for Messrs. T. & J. Arkell. Mr. William Drew, architect, Swindon. £1,500.  
 W. Chambers ..... £1,500.  
 T. Barrett ..... £1,500.  
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**SWINDON**.—For alterations and additions to the "Artilery Arms," Regent-street, New Swindon, for Messrs. T. & J. Arkell. Mr. William Drew, architect, Swindon. £1,500.  
 W. Chambers ..... £1,500.  
 T. Barrett ..... £1,500.  
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## ILLUSTRATIONS.

South Transept, St. Saviour's, Southwark.—Sir A. W. Blomfield, A.R.A., Architect .....	Double-Page Ink-Photo.
Memorial Stalls, St. Saviour's, Southwark.—Sir A. W. Blomfield, A.R.A., Architect .....	Double-Page Ink-Photo.
Design for the Decoration in Graftito of House, Lisbon.—By Mr. T. G. Cesare Formilli .....	Double-Page Ink-Photo.
Widnes Municipal Library and Technical School.—Messrs. Woodhouse & Willoughby, Architects .....	Double-Page Photo-Litho.

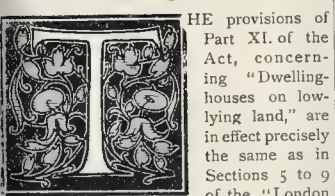
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### The London Building Act.—Concluded.



THE provisions of Part XI. of the Act, concerning "Dwelling-houses on low-lying land," are in effect precisely the same as in Sections 5 to 9 of the "London County Council (General Powers) Act, 1893," which are repealed under this Act. Certain clauses in regard to the Tribunal of Appeal, in this part of the 1893 Act, are cancelled, because the provisions made by them are covered by the general provisions in regard to the powers of the Tribunal of Appeal in another part of the new Act, and the statement of the penalty incurred for infringement of this part of the Act is also relegated to the part dealing generally with offences against the Act. The only difference in wording from the existing provisions is in Section 123, where the words of the similar clause in the Act of 1893, "The Council may with the concurrence of the Tribunal of Appeal from time to time make and alter regulations prescribing the procedure to be followed in making applications," &c., are modified by the omission of the words "and alter." The omission is of no real consequence, as the power to "make regulations from time to time" includes the power of altering existing ones; but it may be taken as indicating an intention to avoid unnecessary or vexatious changes.

Part XII., dealing with sky-signs, is absurdly long and verbose, considering that, like the existing "London Sky-Signs Act" (now repealed), its only aim is to forbid the erection of any new sky-signs, and to place the existing ones under proper regulation during the limited period after which they must be removed altogether. So simple an object should hardly, one would have supposed, have required nearly six pages of an Act of Parliament to carry it out.

The provisions are essentially the same as at present. In the definition of sky-signs the only alteration is that from the phrase "above any house, building, or structure," the word "house" is now omitted (merely, of course, because it is superfluous).

In Section 128, corresponding with Section 5 of the "Sky-Signs Act," and dealing

with the "Regulation of existing sky-signs," the first words run "from and after the commencement of this Act" (instead of "after the passing of this Act") "it shall be unlawful to retain any sky-signs," &c.; but the section proceeds to make the exception in favour of sky-signs erected in accordance with licences "granted or renewed before the passing of this Act," *i.e.*, before August 25, 1894. The distinction should be noticed, as in the Sky-Signs Act the "passing" and the "commencement" were identical, while they are not so in the present Act. An exception is made also, as in the existing clause, in favour of sky-signs under a licence renewed under the present Act "as hereinafter provided;" but it is to be noticed that the existing provision to the effect that no proceedings shall be taken in respect of an existing sky-sign while an application for a certificate or a renewal of licence is pending, is omitted in the new Act.

The law as to renewal of licences for sky-signs now stands thus:—

A licence granted under the "Sky-Signs Act, 1891," and renewed under that Act may, on the expiration of the period of renewal, be again renewed for two years and no more.

A licence granted under the "Sky-Signs Act, 1891," as amended by Section 17 of "The London County Council (General Powers) Act, 1893," after August 24, 1893, may be renewed at two years from its date of issue for two years more, and after that for another period of two years (six years in all from the original term of the licence), but no longer. (This clause takes the place of the first clause of Section 8 of the "Sky-Signs Act.")

The provision for the case of a person desirous of renewing his licence for a sky-sign, and applying to the surveyor for an inspection and certificate, is identical in effect with the second clause of Section 8 of the "Sky-Signs Act," with some unimportant differences in wording. This is followed (Section 129, Sub-section 5) by the provision that after such inspection the surveyor shall either grant a certificate "that in his opinion the sky-sign is so placed, constructed, and supported, as not to be likely to involve danger to the public," or he shall refuse to grant such certificate, in which case he must state the grounds of his refusal. Then follow the forms to be adopted in the certi-

cate in each of the two cases. The applicant, in case of his refusal, may (as under the "Sky-Signs Act") make repairs to or alterations of the sky-sign, and demand another survey. The directions for the action of the surveyor in such case, and the amount of his fee, are the same as in the "Sky-Signs Act," as also the right of the applicant to appeal, but to the "Tribunal of Appeal," not (as at present) to the Council. The remainder of the provisions are the same as in the "Sky-Signs Act," except that in Section 124 (corresponding to Section 14 of the "Sky-Signs Act"), while the sky-sign is to be treated as "a structure certified to be in a dangerous state under Part IX. of this Act" (corresponding to Part II. of the 1855 Building Act), it is specially added that "the provisions of the said part with regard to arbitration shall not apply," and it is lawful for the Council (on obtaining the order of a Petty Sessional Court) to take down the sky-sign. The last sentence of the section, however, is altered from the corresponding one in the "Sky-Signs Act": instead of running that the expenses shall be recoverable "as expenses incurred in respect of a dangerous structure," it now stands "shall be recoverable as though the same were a penalty imposed by this Act."

Part XIII. states with great fulness and precision the position, duties, and powers of the Superintending Architect and the District Surveyors. Section 136 defines the position and duties of the Superintending Architect to the same general effect as in Section 62 of the 1855 Act, along with the provision (from Section 64, 1855), that the Superintending Architect and his clerks shall be paid "such salaries as the Council may direct," and the addition of a clause directing that the person who is the Superintending Architect at the commencement of this Act shall continue to occupy that position under the Act. The Section (63) of the 1855 Act, which empowers the Superintending Architect to appoint a substitute in case of illness, infirmity, or other unavoidable cause preventing him from attending to his duties, is repeated in Section 137 of the new Act.

The Sections defining the duties of District Surveyors include most of the provisions to be found in Sections 32 to 54 of the 1855 Act, but with a considerable re-arrangement of clauses, some new requirements, and some minor differences of detail.

Section 138 states directly and precisely what is implied, but not so directly stated, under the existing law—viz., that, subject to the provisions of this Act and the exemptions contained in it, every building and structure and the work done on it and all matters relating to width and direction of streets, line of buildings, open spaces about buildings, and height of buildings, shall be subject to the supervision of the District Surveyor of the district in which the work is situated.

Section 139 defines the powers of the Council as to District Surveyors and districts on the same lines as in Section 32 of the 1855 Act, with the following alterations: (a) the words "with power from time to time to alter any district so made" are omitted (they are in fact superfluous, as the words "may alter the limits of any district" cover the provision); (b) the consent of a Secretary of State is no longer requisite for the dismissal of a District Surveyor, except in cases where his appointment dates from before August 14, 1855 (the passing of the 1855 Act), and the separate provisions for the dismissal of "any existing Surveyor" and "any future Surveyor" are both included (with more logic) under the single phrase "may dismiss any Surveyor;" and (c) the compensation to be paid to any District Surveyor who may be deprived of his office by an alteration in the limit of a district shall "in case of disagreement" (between the Council and the Surveyor) be determined by the Tribunal of Appeal.

Sub-section 2 provides that, subject to the foregoing provision, the limits of districts remain as they were before the commencement of this Act, and the District Surveyors now in office continue to be District Surveyors under this Act.

To the provision that the District Surveyor shall maintain an office in such part of his district as the Council approve, it is added that the Council shall inform the Local Authority of "any change in the office of the District Surveyor." It is rather awkward that the word "office" is used on the same page in two perfectly different meanings. Here it means, of course, his place of business, but a few lines above we read that "on a vacancy occurring in the office of a District Surveyor they (the Council) may appoint another qualified person in his place" (139 c: 32 (3) in the 1855 Act). Of course one knows what this means, but it has an awkward appearance as a matter of wording, and taken in conjunction with Section 141 might be read as if the Council were to appoint the District Surveyor's clerks.

Section 145 repeats the provision of Section 38 of the 1855 Act as to the two days' notices to be given by a builder to the Surveyor, but re-arranges the clauses so as to make the conditions much more distinct, reads, "building or structure" in place of "building," and inserts the word "clear"—"two clear days" instead of "two days." The latter part of the section, however, contains some important alterations. In place of "the builder engaged in building or rebuilding such building," we have "the builder or other person causing or directing the work to be executed" (see in regard to this the remark in a previous article as to the new definition of the "builder"). The direction that he shall serve on the District Surveyor "a building notice" introduces a new phrase which defines a certain class of notice, and distinguishes it from another to be referred to hereafter; and a "building notice" is to state, in addition to the information at present required, the number of "storeys," and the name and address not only of the person giving the notice (as at present), but those of "the owner then in possession, and of the occupier of the building or structure or of its site or intended site."

In the Section (146) prescribing the action

\* The word "structure" is added throughout this part of the Act, wherever the word "building" alone was used in similar provisions in the 1855 Act.

of the District Surveyor in regard to buildings in progress, the words "the provisions of this Act or by-laws made thereunder" are substituted for the present words "the rules of this Act," thus defining the power of the Surveyor to act on by-laws as well as on the Act.

Section 148 repeats the provisions of Sections 42 and 43 of the 1855 Act (omitting the penalty clauses, which are relegated to another part of the Act), but with the addition that the Surveyor may enter on the works not only during their progress, but "during fourteen days next after the completion" of the work.

Section 150 is a new provision. It specifies that when the "building notice" served on the Surveyor renders it apparent to him that anything is proposed in contravention of the Act, or any requirement of the Act omitted, he is to serve the builder or building-owner with a "notice of objection," and the builder or building-owner may appeal against it in a Petty Sessional Court within fourteen days. The Court may make an order either affirming the objection or otherwise.

Section 151, corresponding with 45 of the 1855 Act, in regard to contraventions of the law discovered by the Surveyor when a building is in progress, is identical in its provisions, but describes the notice to be given to the builder in this case as a "notice of irregularity." It is to be observed that in this section the expression of the 1855 Act, "the builder engaged in erecting such building," &c., is retained, instead of the new phrase "the builder or other person causing or directing the work to be executed," introduced in Section 145. There seems no sort of reason why the phraseology should differ in the two Sections, and we must probably set this down, like some other verbal anomalies already mentioned, to mere carelessness in drafting; but it is to be regretted, and may cause trouble.

We have now three classes of notices distinctly defined in the Act for various purposes: a "Building Notice" (from builder on Surveyor), a "Notice of Objection" and a "Notice of Irregularity" (from Surveyor on builder). This classifying of notices under a distinct nomenclature is a very good point in this portion of the Act.

Section 152 is a piece of new legislation calculated to induce owners and intending occupiers of buildings to keep their builder in the paths of lawful building, since otherwise they are liable to have his transgressions visited on themselves. The section provides for the service of notices of irregularity after the completion of a building and after it has ceased to be under the control of the builder. Clause (a) provides that if a notice of the date at which a building has ceased to be under the control of the builder has been served on the District Surveyor by the builder or owner, a "notice of irregularity" may be served within fourteen days\* on the owner or occupier "or other the person causing or directing or who has caused or directed the work instead of or in addition to the builder (if any)." Clause (b) provides that where such a notice of the completion of the building has not been served on the Surveyor, he may serve a "notice of irregularity" on the owner or occupier, &c. (as defined in the preceding clause) within twenty-one days after the completion of the building. These are salutary clauses, but the second one (b) is likely to be totally inoperative from the extraordinary oversight of not providing any definition of the "completion" of a building. In the case of clause (a) of course the notice given by the builder or owner constitutes a statement that the building was "completed" on that date; but where there is no such statement, who is to decide on the particular day when the building is to be legally defined as "completed"? No special power is given to the Surveyor to do so. It is really extra-

\* Hence, no doubt, the provision under Section 148 (c) that the Surveyor may enter on the building fourteen days after its completion.

ordinary that in an Act in the framing of which legal advice is supposed to have been concerned, such a hole as that should have been left.

Sub-section 2 of the same section provides for the case when the owner of the building does not allow the builder to comply with "notice of irregularity;" the latter may serve a notice on the Surveyor to that effect, and the Surveyor within fourteen days may serve the "notice of irregularity" on the owner or occupier. The consequences of notice served on the owner are the same as in this case as in that of the builder. But it is provided (Sub-section 4) that nothing in the Section shall prejudice any remedy of owner, occupier, or other person against the builder.

Section 153, defining the consequences of failing to comply with a "notice of irregularity" are (except the penalty clause) the same as provided in Sections 46 and 47 of the 1855 Act, though rather differently worded; the only important difference being that "the Council" instead of "the District Surveyor," may after seven days notify enter with workmen on the premises, &c. This seems to imply that the District Surveyor is not to take this procedure into his own hands unless under the special order of the Council as their representative.

Section 154, as to the fees to be paid to the District Surveyor by the builder, owner, or occupier, is the same in effect as Section 48 of the 1855 Act, but differently worded, and the clause providing that one fee only shall be charged in respect of works included in one notice is omitted. In regard to laying out streets, lines of building frontage "and any such-like service" (corresponding to the "special service" of Section 50 in 1855 Act) the District Surveyor shall receive "such fees as the Council shall from time to time determine," but the clause to the effect that the Surveyor shall have the same remedy for recovering such fees as if they were specified in the schedule is dropped from the new Act. Section 156 makes a new provision in regard to fees to the Surveyor for preparation of evidence, and giving evidence before the Tribunal of Appeal; these fees are to be settled by the Tribunal of Appeal.

The ordinary fees due to the Surveyor from the builder, owner, or occupier, are payable (Section 157) as under Section 51 of the 1855 Act, but in the "special service" clause the words run "in respect of a building structure or land," in place of "building" only.

The power to pay District Surveyors salaries instead of by fees is retained. Section 158 (corresponding to Section 65 of the 1855 Act), but the amount of the salary is to be based on the average of the last seven years' fees, instead of "the last three years" as at present, and the fee in that case will not pass, as at present, ordered, through the hands of the Surveyor into those of the Superintendent Architect (to be accounted for by him to the Council), but are to be payable direct "to the Council," to be placed to the credit of the county fund. A sub-section (2) repeats the provisions of Section 67 of the 1855 Act that the Council may at any time provide either wholly or partially for the payment of salaries to the District Surveyors "or to any of them" out of the county fund, and then upon abolish or reduce the fees made by the Act payable to the Surveyor. The phrase "or to any of them" gives power, obvious to pay the surveyors by salary in some districts though not in all, a provision which no doubt suggested by the consideration of the great difference in the circumstances of different districts; where a large amount of building or rebuilding is going on, the Surveyor would realise a considerable amount in fees in the course of the year, while in a settled district where there is little building the fees might hardly pay the office expenses.

The regulations as to the monthly report of the surveyors and their examination by the Superintending Architect (Sections 161 and 162) stand as at present in Sections 52 of the Act of 1855, except that in the clause



as to the examination of the monthly returns by the Superintending Architect the words "from time to time" are omitted in the new Act. The omission of the words (which were quite unnecessary) seems to imply that the examination is to be made as each month's accounts come in, and not at longer or irregular intervals.

Two other new provisions remain to be mentioned in this portion of the Act. Section 159 provides that the Council may, if they think fit, undertake on behalf of a District Surveyor any proceedings which would otherwise be undertaken by such Surveyor, or pay the costs incurred by him in any proceedings under the Act. The wording will be observed, leaves it open to the Council to decline to do this in cases where the Surveyor may have incurred unnecessary expenses by indiscreetly taking action which could not be sustained at law. And Section 163, which is an important one to District Surveyors, makes it the duty of the Surveyor to at once notify to the Council any actual or probable contravention of any provisions of his Act with which he is not himself competent to deal, and which he has either noticed himself or received information of. In short, the Surveyor is to be eyes and ears to the Council, and keep a general lookout for any kind of infringement of the building law, whether within his own province or not.

Although, as already observed, the power to pay District Surveyors by salaries instead of by means of fees is kept in view in the new Act, there is no indication whether or not the County Council have any more leaning in that direction than before. It may be suggested here that it is well worth the consideration of the Council whether it would not be better to adopt the salary system all round, and abolish the fees as payable to the District Surveyor. The fees might still be charged and be recoverable by the Council, since it is both equitable and economical that those who attempt to evade the law should pay the cost of keeping them in order. But there would be much less friction and "bad blood" between builder and Surveyor if the fees, which amount in fact to a kind of fine, were paid to the corporate body rather than to the Surveyor personally. To be found out in an illegal procedure (especially when it may have arisen from ignorance or oversight) is annoying, but to have to pay the man who found you out is almost too much for human nature to endure with equanimity. The salaried position would surely also be a much more dignified and honourable one for the District Surveyor, who could then never feel (as he must often feel now) that he was regarded by builders and building-owners as a person on the look-out to make something for himself out of their lapses from virtue; and considering the class of professional men who seek, and who alone have any chance of obtaining, the office of District Surveyor, it can hardly be considered necessary to encourage them to the strict exercise of their duty in the same way as the men who tap the wheels of railway carriages are encouraged by the hope of a half-sovereign when they can discover a cracked tire. We were indeed told once of a case in which one District Surveyor had in his first year of office doubled the income made by his predecessor, which (if true) implied either that he had been very astute or his predecessor very lenient. But we may certainly conclude this was a very exceptional case on either side, and that the District Surveyors of London generally need no stimulus of fees in proportion to work done to induce them to do their duty, although *Punch* once had the stupidity to represent them as persons who would compound matters with the builder over a glass of beer!

While on this subject it may be observed that the County Council are to be congratulated on having turned a deaf ear to the advice given them from some quarters, to refuse to District Surveyors the right of private practice as architects, and reduce the

District Surveyor to a mere paid official of the Council. The result of such a policy would infallibly have been to place the whole supervision of the building operations of London in the hands of men of far inferior standing and ability to those who now have charge of it.

Part XIV., in regard to by-laws,\* defines (Section 164) the subjects in regard to which the Council may in future make by-laws not repugnant to the provisions of the Act. These subjects may be briefly summarised thus: Plans and sites of streets and buildings; forms of notice and other documents; foundations and sites of buildings, and mode and materials with which they may be made or filled up; thickness and quality of substance of walls; dimensions of wooden bressummers and of joists of floors (iron joists we presume are excluded because practically they must be taken in the sections rolled or rivetted by manufacturers); protection of constructional ironwork from fire; woodwork in external walls; description and quality of plastering; filling in of an excavation within 3 ft. from the external walls of buildings; lamps or signs overhanging the public way, except within the City (by-laws on this point, however, to be administered by the Local Authority); means of escape from fire in buildings over 60 ft. high; duties of District Surveyors in relation to by-laws; deposit of plans of buildings with District Surveyors; and fees of District Surveyors in respect to their duties under by-laws.

Penalties for offences against by-laws are defined by this section as not exceeding 5*l.*, and not exceeding 2*l.* per day for continuance of the offence; amount to be summarily recovered.

Sub-section 2 repeats the present provision that the Council may make by-laws stating terms and conditions of exemption from the observance of any of their own by-laws, if they think proper; and by Sub-section 3 every by-law must be confirmed at a meeting of the Council subsequent to that at which it "shall have been made" ("shall have been framed" would be the more correct expression, as the by-law is not "made" until it comes into force), and the by-law shall have no force or effect until it is allowed by the Local Government Board. It is to be observed that this condition of confirmation or "allowance" by the Local Government Board takes the place of the present requirement that a by-law shall be confirmed by one of Her Majesty's Secretaries of State. The intention to apply to the Local Government Board for this purpose is to be announced by public advertisement two months before such application, and a copy of the by-law is to be sent to the following bodies:—the Local Authority, the Ecclesiastical Commissioners, the Royal Institute of British Architects, the Surveyors' Institution, the London Chamber of Commerce, the Institute of Builders, "and such other societies as the Local Government Board may direct"; and for one month before such application a copy of the by-law is to be accessible for public inspection at the County Hall.

By-laws "made, confirmed, and allowed" are to be published in the *London Gazette* and printed and hung up in the County Hall for public inspection, and copies sold for a charge of not more than 2*d.* The by-law to come into operation at a date fixed by the Local Government Board; but the production of a printed copy of the by-law with the seal of the Council is to be accepted as a proof that it has been duly confirmed and allowed.

No by-law in respect of any matter from which the city is exempted by the Act can have any effect within the City.

These provisions no doubt fulfil all the usual claims in regard to what is called "publication," and the sending copies of the by-laws to the representative bodies of architects, surveyors, and builders, brings

them officially under the notice of those bodies; but there will nevertheless be a good many persons whom a by-law will practically affect, who will not be certain to hear of it by the means proposed; and it has been objected very strongly, and not without reason, that the posting up of a by-law at the County Council offices (or "County Hall") is only a very perfunctory way of bringing it under the notice of the part of the public who may be affected by it, many of whom may not hear of it until it becomes law. The "publication" would have been much more effectual in this respect if, in addition to the other means of publication named, it had been ruled that intended by-laws should be published also in such journals as deal specially with architectural and building subjects, and a good deal of possible inconvenience would be saved to many architects and builders if this course had been adopted.

Part XV. deals with Legal Proceedings and the Tribunal of Appeal. Some portions of this are concerned with purely legal provisions which are not of direct interest to our readers. Section 167 provides that any legal proceedings commenced by a District Surveyor may be continued by his duly-appointed deputy or successor; and Section 170 is a general provision as to the powers of the Council in case of offences in the way of constructing or extending, altering, uniting, or separating a building in any manner not in conformity with the Act. This section gives the general power to the Council, after allowing fourteen days to bring the structure concerned into conformity with the Act, to obtain a summons from a Petty Sessions Court, "notwithstanding the imposition and recovery of any penalty," requiring the person concerned to appear and answer the complaint, and if the complaint is proved to the satisfaction of the Court, to obtain an order authorising the Council to demolish or alter the structure where not in conformity with the law, to remove the materials and to sell them, and to recover from the defaulting person all expenses of the procedure not covered by the sale. If the sale more than covers the expenses incurred, the balance is to be restored to the owner of the structure. In the case of a structure erected illegally beyond the general line of buildings the Local Authority may exercise these powers in like manner as the Council. Section 172 repeats the provisions of Section 76 of the 1855 Act, in regard to the case where no demand is made by anyone professing to be legally entitled to claim the surplus.

Section 173 is an endeavour to put upon an equitable footing the rather difficult question of the responsibility of "owners" and "occupiers" in regard to recoverable expenses. The word "owner" includes the adjoining and building-owners respectively, and the owner "immediately entitled to the possession of the premises," or the occupier, is in the first instance to pay the expenses, with a repetition of the existing limitation that the occupier shall not be called upon to pay any sum greater than the rent due from him in respect of the premises during the period of his occupancy, which amount (under Sub-section 5) he may deduct from the rent payable by him to the owner of the premises. The phrase "during the period of his occupancy" seems somewhat vague; how if he is a tenant from year to year? What is the reading then? The opportunity ought to have been taken to get rid of or amend a provision so very loose and un-legal in character. If there are successive owners each of them is liable to contribute to the expenses in proportion to his interest; and if some owners cannot be found the deficiency so arising is to be divided amongst the owners who can be found. This may be law, but is it "equity?" It seems likely to lead to a good deal of non-finding of owners. Payment of such expenses can be recovered in a summary manner (Sub-section 6) from the person liable in

\* We regret to see that while the "Royal Assent" copies of the Act adopted the correct spelling, "By-law," in the copies for public circulation the incorrect and unauthorised spelling "bye-law" is revived.



the first instance under the Section; and expenses which should be repaid by the person ultimately responsible are recoverable "as if the obligation were a simple contract debt." All differences arising as to the amount of contribution under this Section are to be decided by arbitration.

Section 174 provides for the case of periods falling due during the vacation. When any period, within which sanction or approval is to be given by the Council in respect of any matters arising under Part II, or Part V, of the Act ("Formation and Widening of Streets" and "Open Spaces about Buildings and Height of Buildings"), would expire on any day between August 8 and September 14 (both inclusive), such period shall be deemed to be extended for twenty-eight days.

The Tribunal of Appeal, defined in Section 175, is to consist, as already observed, of three members, appointed respectively by a Secretary of State, by the Council of the Institute of Architects, and by the Council of the Surveyors' Institution, and it is specially provided that no member or officer of the Council (*i.e.* London County Council) shall be a member of the Tribunal. Members of the Tribunal shall be appointed for a term of five years, but may be re-elected, and a member of the Tribunal may be removed by the Lord Chancellor "for inability or misbehaviour or other good and sufficient cause." In case of a vacancy occurring through the unavoidable absence of a member of the Tribunal, the authority or body by whom such member was appointed shall appoint some one to act in his place, whether temporarily or otherwise.

The remuneration of members of the Tribunal may be either by annual salary or by fees, as a Secretary of State may from time to time appoint. The Tribunal may appoint such clerks and other servants as they require, whose salaries will be determined and paid by the Council. The Council may defray the expenses of supporting any decision of their own or of their Superintending Architect or Engineer before the Tribunal.

The Tribunal may (or shall if required by the High Court or a Judge on the application of any party to an appeal) state a case for the opinion of the High Court, which may reverse, affirm, or amend the judgment of the Tribunal. Subject to that provision, and to the general provisions of the Act, the Tribunal will have jurisdiction and power to hear and determine appeals referred to them under the Act, and power to hear counsel, administer oaths, receive evidence, call for documents, &c., and make orders as to costs of appellants; and may also from time to time (subject to the approval of the Lord Chancellor) make regulations consistent with the provisions of the Act as to the procedure to be followed in cases of appeal. Any order of the Tribunal may be enforced by an order of the High Court as if it were an order of that Court. All sums paid to the Tribunal are to be paid over to the Council, and the whole expenses of the Tribunal, including salaries or fees, are to be paid out of the County fund.

On the whole we may say that the Tribunal seems likely, as thus constituted, to be a satisfactory machine for the arbitration of differences, provided that the right men are appointed to it. In regard to the method of remuneration, we should think it very much preferable that the members of the Tribunal should be paid by an annual salary; they are, within the limits of their powers, to occupy a position almost like that of Judges in an Appeal Court, and they should be placed in a similar independent position.

From the wording of Section 178 (as to the appointment of members to fill temporary vacancies) it appears to be assumed that the Tribunal must always sit in full, and that two of the members cannot form a quorum. If this is so intended, it would have been preferable that it should have been distinctly so stated, as there appears to be

some room for a difference of opinion on this point being raised, although the logical deduction from the wording of the Act seems to be that all the members must act together. Another point on which a question might be raised is, whether the judgment of the Tribunal is to be a judgment of the majority—of two out of the three members, as in an appeal court—or whether they must all concur in a judgment to render it valid. This is a very important point, which seems to have been overlooked in the Act.

The regulations as to the serving of notices (Sections 187, 188) are much the same as those in force at present; the only additions are that the general regulation is stated to apply to all notices "the service of which is not provided for by the 'Summary Jurisdiction Acts,' the 'Lands' Clauses Acts,' or the 'Companies Clauses Consolidation Act, 1845';" that a notice to a railway company may be served by delivering a copy to the secretary at the principal office of the company; and that a notice to a District Surveyor, if posted, must, like other notices under the 1855 Act, be registered. Section 187 also makes the special statement that a notice must be "in writing," which, considering the terms of the following section, seems superfluous.

A variety of provisions are included under the heading of "Miscellaneous" (Part XVI., Sections 189 to 199). The first section is a repetition of an existing provision to the effect that all expenses incurred in carrying this Act into execution and not otherwise provided for are to be deemed "general expenses incurred by the Council," and to be raised and paid accordingly. Section 190 gives the Council the option, in all cases in which they are authorised to refuse consent to any Act, of giving their consent on certain terms and conditions, the non-observance of which will subject the offender to a penalty.

Section 191 may be said to be the only clause in the Act which is actuated by æsthetic motives, and as such merits quotation:—

"191. In the event of its being necessary to take down any portion of an old building of architectural or historical interest constructed otherwise than in accordance with the regulations of this Act or in the event of the destruction of any part of such building the part so taken down or destroyed may with the consent of the Council first obtained be restored in the same material and in the same design as it formerly was."

This is well intended, no doubt, and we must credit the framers of the Act with having gone a little out of their way to show, according to their lights, some regard for the historic interest of ancient buildings; but we fear that this æstheticism, like Hamlet's "courtesy" to Osric, "is not of the right breed." If the Act had contained any provision for promoting the preservation of ancient buildings, and throwing difficulties in the way of their destruction, it would have been more to the purpose. But to provide specially for the rebuilding of an ancient building or any part of it, just as it was, is only to promote the production of historic shams, which are worse than valueless.

Section 192 empowers an owner or builder and his servants to enter any building for the purpose of complying with any notice or order under the Act, after giving seven days' notice to the occupier, and after that from time to time on the production of the original notice; and 193, a rather important clause, defines the limit of time of action of the Surveyor in cases where no "building notice" (or other notice requisite under this Act or under a by-law) has been given. The surveyor may enter the premises to examine the building or the work within one month after he has discovered that it is being carried on, and the time during which he may take any proceedings under the Act in respect of such a building shall begin to run from the date of his making the discovery. This Section seems much misplaced under the head of "Miscellaneous," and has the appearance of having been framed to fill a gap in the pro-

visions of Part XIII., not noticed when that Part was under consideration, and then thrust in among "Miscellaneous" to avoid disarranging the numbering of the preceding sections. It certainly ought to have been connected with the other sections defining the powers of the Surveyor, because in fact it constitutes an important modification of Section 146, which provides that the District Surveyor may at all reasonable times survey a building which is being carried on, whether notice has been given him or whether the work has only been "observed or made known to him." But here, a good many pages later, and in an entirely different part of the Act, there is sprung upon the Surveyor an entirely new condition, not hinted at before, to the effect that he must take action within one month after he has discovered the work. To separate two such provisions, the effects of which are so intimately connected, is surely a very faulty arrangement of a document.

By Section 194, applications, plans, and other documents delivered at the office of the Council or to the District Surveyor, in pursuance of this Act, become the property of the Council; and the approval of the Council of any plans or particulars (195) is to be signified in writing by the Superintending Architect.

Section 196 repeats the provisions of Section 96 of the Act of 1855 in cases where the owner cannot be found, though it is noticeable that the words, "having regard alike to the nature and purpose of the subject-matter, in respect of which such consent is given, and to the fair claims of the parties on whose behalf such consent is to be given," are omitted in the new Act; perhaps because it is considered that any judgment of a Court would necessarily be given under such conditions.

Section 197 deals with the storing of wood or timber. It prohibits the placing of piles or stacks of uncut timber, lathwood, firewood, casks, &c. (whether under or above ground), nearer to a street than the general line of buildings thereon, except where such a stack stood on January 1, 1894. By Sub-section 5 timber-yards existing at the commencement of this Act must comply with the provisions of this Section within two years from the date of the passing (no commencement) of the Act, but the Council have power to prolong the term to seven years, or to relax any of the provisions of this section.

Sub-section 2 prohibits the storing of the materials mentioned in Sub-section 1 in the same yard or premises as any furnace except (a) where the furnace is enclosed in a building of fire-resisting materials; (b) where the furnace is at least 10 ft. from the said materials. In continuance the same Section provides that such materials shall not be piled to a height of more than sixty feet from the ground-level, and shall have no room, chamber or space among them, other than passage, "for any purpose whatever." This Section does not apply to such materials when piled on land belonging to railway companies, canal companies, or dock companies for the purposes of their undertakings.

Sections 198 and 199 repeat existing provisions as to the proceedings in respect to a building not being affected by the falling in or removal of the roof, and as to the placing of posts, rails, or otherwise impeding street traffic, in the same terms as at present. This latter section (199) does not apply within the City.

Section 200 sums up the penalties for infringements of the Act, which are thus conveniently grouped together, instead of being dispersed, as in the existing Acts, in connexion with the various separate provisions. The penalty for offences in regard to the laying out or obstructing of streets is reduced from 20s. to 10s. in the first instance, but with the serious addition of a daily penalty of 2s. during the continuance of the offence. Neglect for twenty-eight days to comply with a notice to set back a building involves a penalty of 2s. to 5s., and



daily penalty of 10s. to 2*l*. Infringement of the provisions of Parts III., V., VI., and VII. of the Act involves a penalty of 20*l*. Obstructing the entry of persons empowered to enter on premises to execute any work authorised under the Act involves a penalty of 10*l*. These are the same as under the existing law. A building-owner failing within a reasonable time to make good damage to an adjoining owner's property, is liable not only to the penalty of 20*l*. a day under the existing law, but to an initial penalty of 20*l*. (This is possibly intended to mean the same thing as 20*l*. a day, i.e., 20*l*. for the first day, and 20*l*. for every subsequent day; it is not very clearly put.) Anyone refusing to admit the purchaser of any materials sold under the Act is liable to a penalty of 10*l*., and a daily penalty of 5*l*.

The penalty for erecting buildings within the prescribed distance from buildings used for dangerous or noxious businesses is the same as under the Act of 1844: 50*l*. and a daily penalty of the like amount; and the same penalty for establishing a dangerous or noxious business contrary to the provisions of the Act. The penalties for unlawfully building dwelling-houses on low-lying land also stand as at present.

Any one not complying with the conditions (Section 190) under which a provision of the Act is relaxed by the Council, is liable to a penalty of 10*l*.

A penalty of 2*l*. and a daily penalty of the same amount is attached to the following offences:—Erecting or retaining a sky-sign contrary to the Act; failing to serve a "building notice" or commencing the work after it before two clear days are out; refusing to allow the District Surveyor to inspect a building or to afford him all reasonable assistance in such inspection; failing to comply with any County Court order in pursuance of the Act within the time named in the order; refusing to admit a builder to comply with an order under the Act; being a workman, doing anything about a building contrary to the Act without the knowledge or consent of the person causing the work (this appears by implication to exonerate the workman if he does it *with* the knowledge and consent of his employer—a rather doubtful position); refusing to admit any owner, builder, or his servants to do things authorised by the Act; transgressing any of the provisions as to the storing of wood or timber; and generally doing any other thing prohibited by the Act or failing to do anything required by its provisions.

Finally, there is a penalty of 10*l*. and a daily penalty not exceeding the same amount against any one who without the consent of the Council converts or uses a building "contrary to any of the provisions of the section of this Act (Section 211) of which the marginal note is 'Rules as to conversion of buildings,'" which will be referred to in its proper place.

The whole "Penalties" Section is governed by the closing clause, "The liability to these penalties shall be without prejudice to any other proceedings whether under this Act or any by-law under this Act or otherwise but so that no person shall be punished twice for the same offence."

Section 201, headed "Application of Act," gives the list of structures exempted from the operation of the Act. Most of the existing exemptions are confirmed, but with some differences of wording and arrangement. "Greenwich Hospital," for instance, does not appear in the list, but it is by implication included in the altered form of the clause exempting "Her Majesty's Royal Palaces," &c., which now runs thus:—"Every building, structure or work vested in and in the occupation of Her Majesty, her heirs and successors either beneficially or as part of the hereditary revenues of the Crown or in trust for the public service or for public services." The British Museum is included in a general clause exempting any building "vested in or in the occupation of any department of the Government, or of the Metropolitan Police,

or of the trustees of the British Museum for public purposes or for the public service." The Bank of England is exempted, but the large-hearted clause in the 1855 Act, exempting "any of the offices or buildings hereafter to be erected for the use of the said Governor and Company, either on the site or in addition to and in connexion with the said edifice," is (as we might expect) dropped. The buildings and properties of the Honourable Societies of the Inner Temple, Middle Temple, Lincoln's Inn, and Gray's Inn, are exempted from the Act, but it is significant that in the list of "repeals" in relation to the "Metropolis Management Act, 1878" (which is only partially repealed) we find that in Section 26, which exempts either from the Act or from by-laws under it, the Societies first named, as well as Staple Inn, Furnival's Inn, and the close of the Collegiate Church of Westminster, the words "or in any by-laws of the Board thereunder" are repealed, and a similar repeal is made in the succeeding section of that Act relating to Crown properties. This, however, would not bring such properties under the by-laws of the new "Building Act." It should be added that the exemption of the above-named four "Honourable Societies" in the new Act is qualified by the provision that they shall be subject to the provisions of Part III. of the Act ("Lines of Building Frontage") in respect of any building structure or land which abuts on any public street, place, or way.

The existing exemption clause as to "common gaols, prisons," &c., does not appear, nor is there in fact any mention made of prisons unless they are included under buildings vested in the Government or the Metropolitan Police for public service. Sub-section 5 exempts the Sessions House at the Old Bailey and all other Sessions Houses or other public buildings belonging to or occupied for public purposes by the Justices of the Peace for the counties of Middlesex and London and the City of London, or by the County Councils of London and Middlesex respectively.

For "the cattle market" the Sub-section (7) substitutes "the buildings of the Metropolitan Cattle Market and of the cattle market at Deptford," and any buildings within their premises occupied by any officials of the Corporation for the purposes of those markets.

The entirely new exemptions are as follows:—Any building belonging to a gas company and used exclusively for gas-works; any building used as a workshop or store by the conservators of the river Thames; foundations and walls of buildings belonging to a railway company situate over any station or works of a railway company, or immediately adjoining any railway or railway works and on land acquired under an Act of Parliament; buildings within the station premises of a railway company inhabited in whole or in part by any official of the company. These may be considered almost formal clauses; the following is an entirely new and important one:—

"(10) Buildings not exceeding in area thirty square feet and not exceeding in height five feet in any part measured from the level of the ground to the under side of the eaves or roof plate and distant at least five feet from any other building and from any street and not having therein any stove flue fireplace hot air pipe hot water pipe or other apparatus for warming or ventilating the same provided that no portion of the building extends beyond the general line of buildings in any street."

Sub-sections 11 and 12 repeat the exemptions contained in the clauses in Section 6 of the 1855 Act, in regard respectively to buildings not more than 30 ft. high and 125,000 cubic feet extent and standing 8 ft. from a street and 30 ft. from nearest buildings, &c., and to buildings not more than 250,000 cubic feet extent (216,000 in the 1855 Act) standing 30 ft. from a street and 60 ft. from adjoining buildings. But to each of these is added a clause to the effect that a detached dwelling-house is not to be excluded from exemption because it is within 30 ft. or 60 ft.

(as the case may be) from a stable building used in connexion with it.

Party-fence walls are after all to be exempted (Sub-section 13) when not more than 7 ft. high from the top of the footings. A new clause exempts entirely greenhouses "when not attached to other buildings" (the qualified exemption when "attached" remaining as at present).

The growing taste for window-conservatories is recognised under Sub-section 16, which permits cases of metal and glass solely for holding plants, fastened to the woodwork of the sill "and lower sash" of a window, not projecting over the public way and not projecting more than 12 in. from the external wall. Why fastened to the "lower sash"? Is it pre-supposed that the lower sash is to be fixed open in this case? It is not easy to understand what is the practical meaning of this provision.

The second clause of Sub-section 17 (the first is an old clause) provides that if any addition is made to the buildings specified in Sub-sections 10, 11, and 12, altering the height, area, or extent of such building, the Council may give notice to the owner or occupier either to remove such addition or to make the building conformable with the provisions of the Act (as if not exempted) within fourteen days, failing which, the Council may remove it and recover the expenses.

Section 203 exempts buildings for the supply of electricity from the general provisions of Parts V., VI., and VII. (this is really provided for under Section 75, so that the clause is superfluous), but requires plans to be submitted to the Council for their approval.

Section 205 provides that, in addition to the exemption of Gas Companies, nothing in the Act prejudices any of the powers or privileges conferred upon a Gas Company by Act of Parliament "as existing immediately before the passing of this Act."

By Section 206 any building exempted is only to be so as long as it is used for the purposes for which it was exempted.

Section 208 (which is entirely out of its place) makes the provision, the omission of which we noticed in a former part of the Act, that a party-wall not in conformity with this Act when taken down or destroyed to half its extent becomes a new party-wall, and must be entirely rebuilt. This ought to have gone among the provisions in regard to party-walls, or in regard to new buildings. In fact, some of the clauses in the latter part of the Act seem to be merely the supply of omissions and oversights in earlier portions of the Act, crammed in at the last moment. This also is not a business-like way of drafting an Act.

Sections 210 and 212 refer to the case of buildings erected before the commencement of the Act, or in progress at its commencement. The first provides that buildings erected before the commencement of the Act and in conformity with the then existing law shall be deemed to be in conformity with the new Act, "subject to the provisions of this Act as to new buildings or the alteration of buildings"; and 212 provides that any building structure or work which has been commenced before and is in progress at the time of the commencement of this Act, may be completed in accordance with the provisions of the Acts in force immediately before the commencement of this Act. The same privilege is allowed in the case of buildings contracted for before the "passing" of the Act (i.e., before August 25 of this year). This provision, as we have already observed, ought to have been coupled with the definitions of new buildings, and is apparently an afterthought.

Section 211 (the section of "Rules as to Conversion of Buildings" referred to in the "Penalties" portion of the Act) forbids the conversion of any buildings (unless the Council otherwise allow) in such a way that when converted they will not be in conformity with the provisions of the Act relating to the class of buildings to which they belong.



The specified cases, in respect of which this caution is given, are (1) converting into a dwelling-house any building not constructed for human habitation; (2) converting one dwelling-house into two or more, or (3) converting two or more into one; (4) converting an "exempted" building into a form in which it would not have been exempt if originally built so; (5) re-converting to a dwelling-house any building which has been discontinued from that use; (6) converting into a dwelling-room any part of a room used as a shop; (7) converting a dwelling-house or any part of one into a shop.

The only portion of the Act which remains to be commented on is the Third Schedule, of "Fees Payable to District Surveyors." These are made out in great detail for every possible case, and entirely in schedule form, so that their effect can be immediately apprehended. It is one of the eccentricities of procedure in regard to the form of this Act, that while the framers of it have scheduled the whole of the Surveyors' fees, many of which were not scheduled before but only defined in long sentences, they have taken the opposite course (as before observed) in regard to thick-nesses of walls, and gone back from the convenient schedule form to the less convenient form of writing out. The list commences with a new fee of 10s. for any building not exceeding 30 square ft. in area and not more than 10 ft. high. The main fee, for new buildings not exceeding 400 square ft. and not more than two stories high, remains as before, 1*l.* 10s.; and, generally, the proportion of fees seems to come to much the same result as at present, but it is to be observed that the existing qualification in the case of new buildings, "but no fee shall exceed 10*l.*" does not appear in the new schedule. Some general regulations are added as to certain points and certain exceptions in regard to fees. It may be noticed that although a Surveyor is expressly prohibited (in the body of the Act) from charging tenement chambers in one building as separate buildings, he is empowered in the Schedule to raise the fees by one-half more than the specified amounts in the case of buildings divided into tenements.

This concludes our review of the Act, the object of which has been both to offer criticism (in reference to any possible future amendments), and to give a general sketch, free from the necessary repetitions of a legal document, of the extent and manner in which the new Act will modify the conditions of building work within the County of London.\*

#### NOTES.



AN important decision, affecting many heavy claims against the United States Government in regard to duties on imported articles, has just been given by Judge Colt, of the United States Circuit Court at Boston. The decision relates to the case of Mr. Joseph Burtwell, an importer, against Mr. Leverett Saltsinstall, formerly collector of the port of Boston. Mr. Burtwell is an importer of iron, and some time ago imported into the United States iron beams, which were used in the construction of the new Court-house at Boston. The goods were invoiced as "manufactures of iron," upon which there was a lower rate of duty than upon iron beams. The collector classified them as "iron beams," and the higher rate of duty was paid by Mr. Burtwell, as the beams were wanted at once. The question at issue was on the interpretation of Sections 3,011 and 2,931 of the Revised Statutes of 1877, regulating the time, manner, and nature of a protest against the payment of duties. Mr. Burtwell filed a written protest with the collector within ten days after payment, but the Government contended, when arguing the case, that the protest should have been made

when Mr. Burtwell paid the estimated duty. On this point hinge all the other cases which have been brought against the United States Government to recover duties paid under protest. Judge Colt has now decided that Mr. Burtwell was right. It is stated that the Government will appeal against the decision. This is said to be the first decision ever given on the point in question, and as a test case involves large sums of money in claims now pending in New York and elsewhere. It is estimated that the total amount involved is about 25,000,000 dols. (5,000,000*l.*).

THE restoration of Bremen Cathedral is now practically completed. The chief work was the rebuilding of the two towers, which have been in ruins since the middle of the seventeenth century, and this has now been carried out in accordance with designs by Herr Salzmann, as near the original as the information now extant permitted. The cathedral was commenced in the eleventh century by Archbishop Bezelin, and was to have been a reproduction of Cologne Cathedral, but the plans were subsequently altered by Archbishop Adalbert, who took as model the Cathedral of Beneviento, the result being a blending of the Gothic and Romanesque styles. The towers, 93 metres high, are of six stories, the uppermost being open; the remainder of the front is richly decorated with sculpture. Between the portals are mosaics, from designs by Professor Schafer. The cost of the works, amounting to 100,000*l.*, was borne by public subscription at Bremen.

THE Report of the City and Guilds of London Institute for 1893-4 comments on the fact that the ratio of increase in the number of successful candidates in the honours classes is falling off. Last year there was an increase of 60 first-class and 47 second-class candidates. This year there is an increase of only 15 in the first class and 65 in the second; and one reason suggested for this falling-off is that there is not sufficient opportunity in the Institute for the higher class of instruction and practice. An examiner suggests that it would be better if honours students were taught in special honours classes; as it is, the candidates for honours can only obtain further teaching by attending the ordinary class for a second session; and the opinion is expressed in the Report that efforts should be made to establish advanced classes, or to enable students to pursue their studies at other institutions where such advanced instruction can be obtained. Among the new features introduced in the present session is the institution of preparatory classes in electric lighting, and arrangements have been made for holding an examination next year in bookbinding, with the intention of developing the artistic side of the subject. To meet the requirements of foremen and others engaged in the slate-working districts in Wales, a syllabus of instruction in slate-quarrying has been added to the programme, and the first examination will be held in May, 1895. The syllabus on "Manual Training (metal-work)" has been re-written, but the teaching of metal as a branch of manual training in elementary schools is regarded as being still tentative, and some doubts are entertained as to whether instruction in metal-work can be made "disciplinary" in the same way and to the same extent as in the case of wood-work. In regard to the examinations in wood-work, the examiners complain of the inadequate preparation in drawing of many of the candidates, and the large proportion of successful candidates who have obtained only a second-class certificate in this subject is mainly due to the imperfect manner in which their drawing exercises were executed. "Candidates," it is observed, "appear to think that a certain amount of practical skill in wood-working is sufficient to qualify them to give instruction in the subject, without regard to the importance to them, as teachers, of being able to draw with care and precision." In this latter remark we entirely concur.

THE twenty-fifth exhibition of works sent in for the annual competition instituted by the Turners' Company, and held at the Mansion House during the past week, only serves once more to show what we have so often insisted on in regard to technical education—viz., that in such crafts as that of the turner real efficiency is only to be obtained by the careful study of design and technique combined. Many of the exhibits show great proficiency in execution, which is entirely lost because employed—we had almost said, wasted—in the execution of some subject which is quite unworthy of, and ill-adapted to the material in which it is executed. The works on exhibition include turning in stone, wood, ivory, and metal, but by far the greater number are in the two former materials. The first prize in the wood section is awarded to a wooden "centre-flower" for a ceiling, a subject which does not seem to lend itself well to the turners' craft, the subject is poor in design, with geometrical interweaving figures. In the stone section most of the exhibits consist of vases, bowls, and the like, and are executed in beautiful specimens of porphyry, agate, serpentine, and alabaster. The first prize is awarded to a pair of vases executed in Blue-John spar, from Derbyshire, the beautiful colouring of the material considerably helping the design. In the ivory section, which we should have thought would have appealed to a large range of craftsmen, very few exhibits are shown. The competitions themselves seem to be conducted on lines which are hardly fair to the competitors, the awards being made of different subjects. In this respect it seems to us that the only proper method of arriving at a just decision is to set the subject, and judge the results so that all the prizes may be awarded on the same basis. The exhibition shows that there is plenty of room for the circulation of well-judged designs by competent artists, and it is a subject which the Turners' Company might do well to develop by the appointment of additional judges belonging to the artistic side of craftsmanship.

WE lately directed attention (see page 266 *ante*) to the discoveries that have been made in the course of further excavation at the Saxon cemetery on High Down Hill, Sussex. The hill acquired some celebrity in a later age through another burial. It is the place chosen for his interment by John Oliver, the miller. Dying in 1793, he was buried in a tomb he had erected in his lifetime, near his windmill, having left a charge of 20*l.* per annum for keeping up the tomb and a summer-house he had built close by.\* The hill-top commands an extensive view over the sea and Sussex Downs. Findon lies in the valley, not far distant are Castle Goring, and Tarring, where a Beckett is said to have first introduced the fig-tree into England, and Salvington, the birthplace of Selden, whom the parish register mentions thus: "1584, John, the son of John Selden, the minister, was baptised the 20th of December. Died 1654, aged 70." Selden was buried in a vault beneath the east end of the Temple Church, London.

THE strength of the fourth exhibition of the Society of Portrait Painters (at the New Gallery) lies in the contents of the first room, and the finest point in that is an oil portrait, Mr. Watts's grand painting of "Mr. Percy Wyndham" (7), which was seen at the Royal Academy a good while ago. Mr. Stuart Wortley has made a brilliant success in realistic portraiture in his painting of "Mrs. William Duncombe" (20), kneeling, in a charmingly unstudied attitude on a low chair by a grand piano; she is clad in a sumptuous crimson velvet dress; the whole of the accessories, including the heavy and ugly case of the conventional piano, are most solidly and carefully painted. This

\* The following *errata* should be corrected: Page 235, third column, lines 16, 18, the "6 in." and "12 in." should be transposed; page 254, third column, line 6, "3,000" should be "3,500."

\* The mill has long since disappeared. We saw the tomb and summer house in 1872.



not the highest or most ideal kind of portraiture, but it is a very fine picture of its class. Mr. Collier's "Miss Brenda Pattinson" (41), opposite to this, is a piquant contrast; it is very flatly painted and in low but delicate harmonies of colour; the lady reclines on a sofa in a picturesque Japanese dress. Mr. Hudson's portraits of General and Mrs. Alexander Stewart (17, 23), are rather hard but otherwise very effective; Mr. Alfred Hitchins's "Mrs. Evans" (16), is a fine piece of colour; Mr. Calderon's "Mrs. Fellows" (36), remarkable for the beautiful drawing of the left arm; Professor Herkomer's "Herman Herkomer" (29) a Gothic-looking picture in Gothic ungilt frame, stands out powerfully from the canvas but is almost ostentatiously devoid of grace or charm of colour or anything else. "Mrs. Lebégué" (30) would never be taken for a work of Bastien Lepage without the aid of the catalogue, nor is it calculated to add to the repute which the late artist gained by work of a very different type. In the North Room one of the best things is M. Cormon's very vivacious portrait of "M. Allard" (65). Mr. Shannon's half-length of "Mrs. Creelman" (58) is a brilliant kind of fantasia in tapestry and lace, looking somehow full of movement, a moment of inspiration in effect. Mr. Herman Herkomer seems to have been engaged in producing an imitation Gainsborough in his portrait of "Mrs. Wansborough" (69). M. Besnard's "Study in Orange and Blue" (71) cannot be passed over, but it is rather crude and harsh in effect. Mr. John Lavery has painted with great delicacy a seated portrait of a French lady (80) with a beautiful and refined head, and Mr. Jacob-Hood gives a capital example of the straightforward matter-of-fact type of "likeness" (as it used to be called) in his half-length of "Mr. W. L. Christie" (83). Professor Herkomer's large picture of the dancer in the midst of a skirt-dance (130) in the South Room, almost hid in a whirl of drapery, is a bold attempt at a very unpromising subject, but the result is not pleasing, however one may admire the cleverness of it, and the manner in which the one foot seen beneath the whirling of drapery conveys the idea of the strenuous action of the figure.

THE glory of Claridge's Hotel, the contents of which are to be sold by auction next week preparatory to pulling down the premises for the erection of a new hotel, seems to have resided more in its aristocratic position and associations than in actual splendours. To say truth, it was a poor "poky" place to have the repute of being the special resort of royal and distinguished visitors, and those who looked in at the private view this week must have felt a little dis-illusioned. The royal suite on the first floor, which alone contains anything worth looking at, consists principally of a couple of large sitting-rooms, one looking on Brook-street and the other on a back court which has been not unsuccessfully treated with niches and sculpture, and casts of two of Flaxman's medallion bas-reliefs on the wall facing the house, so as to humanise the outlook a little. These rooms contain some good furniture, partly English of Early Victorian type (including, by the way, a massive specimen of the old familiar type of mahogany round table with a ponderous centre column and a tripod foundation), some very good pieces of older furniture of Louis Seize and Louis Quinze and Empire types, an inlaid buhl table, and a considerable number of clocks, candelabra, old Sevres vases, and other such articles, containing many varieties of fanciful design, but looking rather more attractive in the photographs than are circulated than in reality. The proprietors might have managed something better for the wall-covering of the "royal suite" than the heavy ill-designed paper which covers them, and which must have been put up, of course, long after the time when an abundant choice of really artistic papers could easily have been had.

Some of the best attractions in the furniture are perhaps to be found in the large, roomy, and solid-looking wardrobes and chests of drawers to be found in some of the upper rooms.

#### THE EXTERNAL COLOUR-DECORATION OF BUILDINGS.\*

BY T. G. CESARE FORMILLI.

AMONGST the many considerations suggested by the works of the old masters in Art, there is one concerning the external decoration of houses which leads to the enquiries: Why is it that today, when the words "old masters" are on the lips of all, when we consult and study them, that we do not take examples from the various methods that they had of externally decorating their edifices with such beautiful effect? and why do not we also unite colouring with architecture? Colour does not disturb form in any way; in fact, when colour is well-conceived, it greatly helps to bring out the full beauty of form. The Assyrian Art, the Egyptian, Greek, Roman, Arabian, Gothic, and, finally, the Art of the fifteenth century, entered into the decoration of innumerable edifices of great importance, some with monochrome colours and some in polychrome; whilst we, with few exceptions, when we want to do something above the ordinary level, generally resort simply to the usual terra-cotta or stone of uniform colour and to very little else.

We must, however, here note that, in spite of the general similarity of the external decorations of the present age, we see in them from time to time a tendency to more closely study the old masters, and we notice a certain revival of old ideas of great artistic value relating to external decorations in colour.

There is much that could be said about the art of uniting colour with architecture in the Greek and Roman periods, but the time is too limited on this occasion to attempt to cover so extensive a field. I will, therefore, limit myself to a few remarks about the methods adopted by the fifteenth-century artists for adding beauty and variety to their edifices. I ought also to say that amongst the many and varied styles of external decoration of the different artistic periods in different countries, that used by the fifteenth-century masters, which lends itself so particularly to our requirements, greatly surpassed every other style of decoration which had, up to that period, been used. What have we, it may be asked, more beautiful in external decoration than the immortal works of the Della Robbia, and the graffito, the chiaroscuro and frescoes of Polidoro da Caravaggio, Pellegrino da Bologna, Maturo Fiorentino, Guido Romano, and Raffaello? These artists, who possessed such refined taste, covered many and many external walls of houses and palaces, which, for the proportions of the windows, the elegance of the columns, and that of the cornices, have excited immense admiration, and yet those beautiful and various decorations, framed, as it may be said, by the surrounding elements of architecture, have hardly been considered worthy of study, except in very rare cases.

Rome, Florence, Venice, and many other principal and secondary cities of Italy can give innumerable examples of the beautiful art of external decoration, which, in virtue of the material used and the mode in which the work was done, have endured through many centuries, as well as the architectural stonework which encloses them.

However, we must note that in those golden times the term "decorator" conveyed something more elevated and noble than it is frequently understood to mean to-day. In fact, in the past, a Michelangelo, a Raffaello, a Cellini, were embraced in the title of decorator. Whereas in these days it is rarely that we see a work of industrial art executed by an artist of high reputation; there seems to be a prejudice against such work. Why, then, do we not entirely abolish this prejudice? Why do not artists who have great names, and those who have not, return to those good and wise traditions of the old times? What variety, what elegance of effect might be added to the many houses that are now being constructed with so much good architectural taste if there were introduced in some or all of the blank spaces decorations of majolica, graffito, chiaroscuro or fresco as in the fifteenth century.

Let us, however, now pass on to the principal methods of external decoration most used in that period, beginning with that of majolica.

Besides being extremely beautiful, the majolica decoration has the advantage of preserving the walls by preventing the penetration of moisture into the interior, and thereby protecting in the same way both the owner's property and the occupier's health. As is generally known, external decoration in majolica is often seen in the Southern climates, whereas in England if used at all it is chiefly for interiors. If we ought to believe in the old Latin saying, *utile dulci*, majolica would hardly be selected for the internal decoration of dwelling-houses in cold climates, for although in a certain sense it must be considered useful, it certainly would tend to discomfort indoors under ordinary circumstances during cold weather.

Externally, however, as already said, it protects the walls from rain, fog, and from dirt; presenting at the same time to the eye a magnificent and varied effect. We may imagine the effect of the front of a house well designed by the architect for the application of majolica, having beautiful friezes, medallions, panels, &c., in this material, and of truly artistic creation in the sober sense in which the old masters intended. A large frieze, as made by Luca, Giovanni, or Andrea Della Robbia, with spaces between the windows, fitted with beautiful symbolical figures, representing, for example, scenes from family life, or fitted with scenes of child life, as Andrea fitted the famous medallions which decorate the space above the arches of the Hospital of the Innocents, in Florence.

What beautiful and sublime external decoration is made by the five figures of Giovanni Della Robbia, in Pistoia, namely, Faith, Hope, Charity, Prudence, and Justice; also by the immortal frieze, called "The Seven Works of Mercy," of which beautiful copies can be seen at South Kensington Museum, and which are good in any case as an inspiration in that class of external decoration. Not less important or beautiful are the medallions of the arms of the King of Anjou, and the months of the year, both by Luca, and also found amongst the many treasures of the same Museum.

It would be too long to enumerate the many examples of decoration in majolica by the Della Robbia's family, who began with Michael, born about 1320, followed by Luca about 1399, by Andrea in 1435, and by Girolamo in 1488. Afterwards one branch of this family became almost French, and finished with Guido Della Robbia, who did not reach the age of touching the clay, but died in 1625 at the age of only five years.

Another system of external decoration not less beautiful and well adapted to resist atmospheric changes is without doubt that of graffito, which was adopted with immense technical and artistic knowledge in the renaissance of Italian Art.

Such decoration, whether it be for its weathering powers in severe climates or for the magnificent artistic and at the same time subdued effect which it produces to the eye, certainly merits being considered as beautiful as decoration in majolica.

On the Continent, and especially in Germany and Italy, the art of graffito is extensively used, but here in England many must regret that graffito decoration has been almost entirely neglected. It is difficult to account for this unless it is due to erroneous impressions that the English climate would injuriously affect the work, or that it may be too expensive for general application.

Regarding the cost, I need only say that it would compare favourably with any decoration, even if it were of the simplest description, in stone or terra-cotta.

As to the durability of graffito, it is, if properly executed, quite capable of resisting heat, frost, and rain, because it presents a very hard surface, and is much less porous than ordinary stones or bricks, whilst it lends itself to being easily washed, which is an advantage in foggy and smoky atmospheres. Of the very few examples of graffito existing in London, that which is at South Kensington, although not executed according to the method of real graffito, affords nevertheless good evidence that decorations of this character do not suffer materially from long exposure to atmospheric changes. If they are a little darker in tone than when they were executed, they still are perfectly distinct, and, without doubt, of a finer tone and more harmonious than when done by the artist. Here I ought to add that the work just mentioned is cut much deeper than graffito as intended by the old masters in this art—masters to whom we ought to feel deeply grateful for having added this treasure to their already invaluable bequests.

Vasari wrote of the graffito of his day, and gave considerable information about it. He referred

\* A paper read at a meeting of the "Art-workers' Guild," London, on October 5.



to it in words which may be translated as follows:—"Artists have another sort of art, which is called grafitto, and serves for ornamenting the fronts of houses and palaces, which may be quickly decorated by such a system, and more surely resists the rain. Its durability is entirely due to the etching on the wall instead of being simply drawn in chiaroscuro or in colours." He then describes the process of preparing and tinting the cement or plaster which is to be laid on the part of the building to be decorated, and which forms the background of the work, and explains how this is afterwards covered with a wash of lime of travertine, through which the lines are etched with an iron point. He further describes how backgrounds are obtained by the entire removal of the surface wash, and shows how strong projecting shadows for grotesque figures or designs of foliage may be produced by adding stronger shades of the same colour to the background.

Referring again to the grafitos at South Kensington they may be described as *low relief in grafitto* rather than grafitto proper, because the cut into the plaster or cement bed is excessively deep. The depth of the cut made with the iron or steel point by the artist in that particular work is a disadvantage, necessitated by plastering on the final coat instead of merely washing it on. So deep a cut gives a hard appearance to the design, and impedes the water from running off the walls, whilst tending to accumulate dirt. The true Italian grafitto is without this inconvenient feature, because the depth of the cut is scarcely perceptible. The cut or score made by the instrument does not generally exceed the thickness of a sheet of drawing paper, or in other words very little more than the thickness of the surface layer with which the bed-work is covered. Extremely beautiful effects can be produced under these conditions, perhaps more beautiful than can be obtained with a soft pencil on a rough paper. The weight of the leaning point of iron is itself sufficient to remove the light surface, and to make the dark background appear without fatigue to the hand.

In some backgrounds colours in monochrome are sometimes added, and these are treated just as you treat fresco, which is very easy after experience has taught the difference between the tint in its wet and dry state. Some of the finest and richest effects are reached by the addition of gilding to some part of the grafitto, as ribbons, fruits, arms, &c. The gold, however, must be added when the grafitto is perfectly dry.

Naturally there is much in grafitto decoration that experience teaches, but it is not very difficult to execute, and it seems to be deserving of more attention in these days of progress, in virtue of its durability as well as of the excellent effects it lends itself to producing. There seems to be a good field open for teaching grafitto decoration in the art schools, which have been so largely established in this country.

There are still other modes of decorating the exterior of edifices which were adopted by the fifteenth-century artist—namely, that of *chiaroscuro* in fresco, and of fresco in colours. The first has, at a distance, all the appearance of grafitto, and, although the design is not cut, it has similar colour and effect.

Much was done in this style by Maturino Fiorentino and Polidoro da Caravaggio, both of whom arrived to the highest point in this art of decoration with their immortal work of *chiaroscuro* in fresco in Via della Maschera d'Oro in Rome. Many other examples could also be mentioned, but as this work is the most important amongst the others, it will suffice as an illustration of this beautiful art. The frieze representing historical scenes is the most important decoration, and in a certain sense it recalls to mind the sequence of pictures which compose the triumph of Cesare, by Mantegna, at Hampton Court.

Speaking of fresco, what is meant is the real Italian fresco, and not tempera or incasto, which is occasionally confused with it. As an external decoration it may be considered to be truly ideal, and it is to be regretted that in England it appears to be absolutely out of fashion.

Outside fresco, when it is done with good and pure earth colours, upon suitable lime mixed with much sand and puzzolana of that sort which the Romans used or the Colosseum, becomes very solid, hard, lasting, and washable, just like compact and durable stone.

It is really to be regretted that to-day the exterior of buildings is so much limited in the matter of decoration to frames, columns, or, in a few words, to architectural mouldings, whereas the old masters of nearly all ages introduced into their edifices all that contributed beauty. Why,

it may be asked, render so poor the mother of all Arts—the one which more directly speaks to our souls, which is so impressive, which cheers and covers us?

## Illustrations.

### SOUTH TRANSEPT, ST. SAVIOUR'S, SOUTHWARK.

**T**HE front of the south transept was repaired in brick in 1735. When taken in hand by Mr. Wallace nearly one hundred years later, enough of the old work still remained to show that the original design had a high-pitched roof, with a gable recessed behind a straight parapet, and that the great window, of which the old arch existed, was in its main divisions similar to that of the present design, although all cusping and tracery had disappeared.

Mr. Wallace's so-called restoration quite ignored all suggestions to be found in the ancient work of the church; and the window, which he partly copied from a circular one in the neighbouring Palace of the Bishop of Winchester, was singularly ill-adapted for stained glass. The offer of this by a munificent donor to the church led to the new work which is now going on under the direction of Sir A. Blomfield, A.R.A.

### MEMORIAL STALLS, ST. SAVIOUR'S, SOUTHWARK.

**W**HEN the present Bishop of Winchester was translated from Rochester to the see over which he now presides, a committee was formed to raise a fund for providing some memorial of his episcopate in the church of St. Saviour, Southwark, the re-edification of which he had so much at heart. After various proposals it was finally determined that the memorial should take the form of canopied stalls, three on each side, for which there is just room against the piers of the eastern tower arch.

Whether the church is ever raised to the dignity of a cathedral or not, it must always be (like those of Manchester and St. Albans) also a parish church, and one that may be expected to have crowded congregations. It was therefore felt that the choir must be kept as open as possible. For this reason there will be no return stalls, and those eastward of the memorial will be uncanopied.

The contractors for the whole of the works at St. Saviour's are Messrs. T. Rider & Sons, but the memorial stalls being of somewhat special and elaborate character, they have entrusted their execution to Mr. Thompson, of Peterborough.

### GRAFITTO DECORATION OF A HOUSE AT LISBON.

**O**NE of the principal ideas of the artist in the conception of this design of decoration in Grafitto was that of keeping—or, better still, helping to develop—the architectural idea which the architect had in his mind in the construction of the building. Such an idea is, without doubt, the chief one which an artist must bear in mind in cases of external decoration.

The basement has been imagined simple, solid, and severe, leaving all the richness of decoration for the first floor, where between the windows are symbolised, by female figures, the principal arts, industries, and sciences. In the medallions above each window, supported by boys, are represented the great masters in these pursuits.

On the second floor the design goes back to a certain extent to greater simplicity of treatment, being confined here to mere decorative motives. Some monochrome colours are introduced to further harmonise the tone of the building with the surrounding landscape.

T. G. C. F.

### TECHNICAL SCHOOL AND LIBRARY, WIDNES.

**T**HE site chosen for this building is a most favourable one, being level, well drained, and abutting on to the main road, and having elevations to three good streets.

The design was selected in open competition, on the advice of Mr. Henry Hartley, F.R.I.B.A., of Liverpool, the assessor called in by the Committee.

The building is divided into two sections, a public free library in the one, and a science, art, and technical school in the other. The following accommodation is provided:—

The public library is central, having perfect supervision of the adjacent rooms, also in itself having ample storage room for books and papers; due provision is made for future extensions, and ready access to every room. The news-room has been given a prominent position, and will be one story building with open timbered roof, thus obtaining ample light and air space without detracting from the appearance of the façade to Victoria-road, which is the principal street in Widnes.

The boys' room, being planned next to the librarian's room, is under his personal supervision, as well as under that of the assistant in the lending department. The lending library is lighted by both top and side-lights. A book-store will be arranged in gallery form, with a storeroom for old periodicals and newspapers.

In the technical and art schools every teaching-room throughout is lighted from left hand side and back; the different classes are grouped into departments, the chemical department and handicraft class-room isolated from the rest of the school.

The building will have two main entrances from the ground floor, with vestibules to each, both facing Victoria-road, one for the public library, the other for the technical schools; the latter has a keeper's house and committee-room adjacent. A separate side entrance and exit will also appear on the west elevation for readiness of access and despatch to the frequenters of the lending library. The chemical laboratory will stand on the back of the site, and furthest away from Victoria-road. The laboratory will be entered through double doors, will have open timbered roofs, and will be spacious and lofty. It will be fitted with five workable tables (double) to accommodate forty students. The fittings generally will be of pitch-pine, with teak tops to the tables. In conjunction with the laboratory are provided a balance-room, store and re-agent room, and bottle-rooms, together with the lecture room for demonstrations, &c., fitted with rail gallery, demonstrators' table, &c.

The whole of the warming and ventilating will be carried out by the Sturtevant Engineering Company, London, whose system was finally adopted by the committee after an exhaustive examination of many other mechanical systems present in use. By this arrangement the whole of the building, or any portion as desired, can always be flooded with pure warm air in the winter, and pure cold air in the summer; the same system of ventilating and heating will apply to corridors, staircases, and entrances; the system is arranged to completely change the whole of the air in the building three or more times within the hour, and maintain an even temperature throughout at 60 to 65 degrees.

With regard to the material used, all exposed internal joinery will be executed in pitch-pine, stained and varnished; corridors, passages, and reading-rooms of pitch-pine blocks; while the entrance hall will be paved with ceramic mosaic of simple design.

The elevations are designed to be faced with machine-made Ruabon bricks, with all the dressings in red terra-cotta, which are being supplied by Mr. Henry Dennis, Ruabon; the enriched parterre and ornament generally being specially modelled from cartoons approved by the architects.

The erection of the whole of the work has been entrusted to the hands of Mr. Isaac D. Worth, contractor, of Wavertree, Liverpool, from the designs and under the supervision of Messrs. Woodhouse & Willoughby, of Manchester.

It is estimated that the structure will take about eighteen months to erect, at the total cost about 12,000*l.*, including equipment.

### COMPETITIONS.

**ADAM SMITH MEMORIAL, KIRKCALDY.**—Special meeting of the Kirkcaldy Town Council was held on the 15th inst., for the purpose of selecting competitive plans for the Adam Smith and Beveridge Halls and Library. Prov. Stocks presided. No. 7 plan (Messrs. Dunn, Findlay's, Edinburgh) was awarded first premium of 50*l.*; Messrs. Campbell Douglas, & Morris Glasgow, second, 30*l.*; and Mr. Simpson Stirling, third, 20*l.*

"A NOTE IN GERMANY."—We have had defer the article so entitled in consequence of space taken up in this issue by other matter.





THE BUILDER, OCTOBER 27, 1894



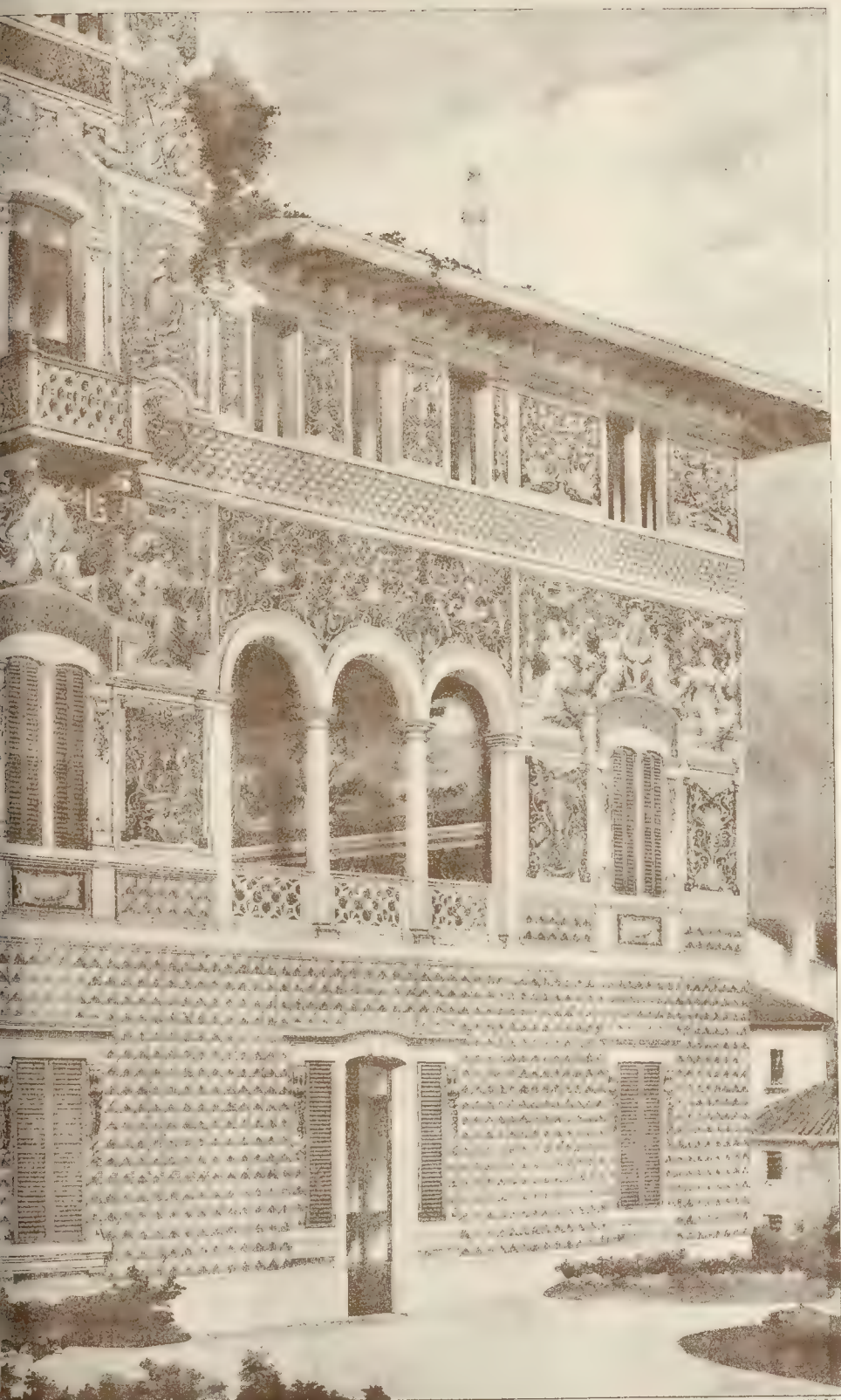




DESIGN FOR THE DECORATION  
 IN GRAFFITI ON THE HOUSE OF  
 ST. J. GUALA, L. S. R. O. V.  
 BY T. G. GEORGE F. R. V. E. L. L.







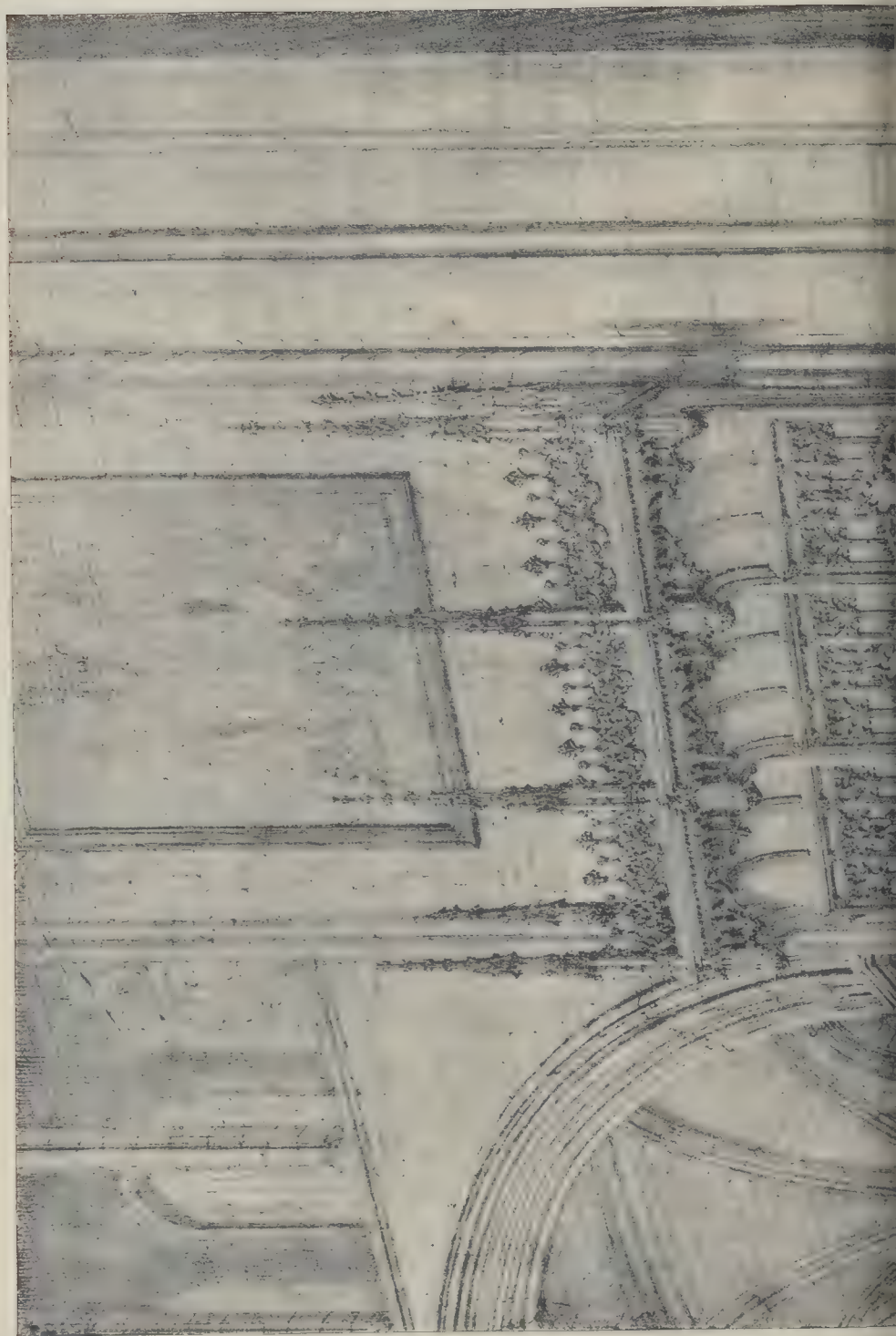
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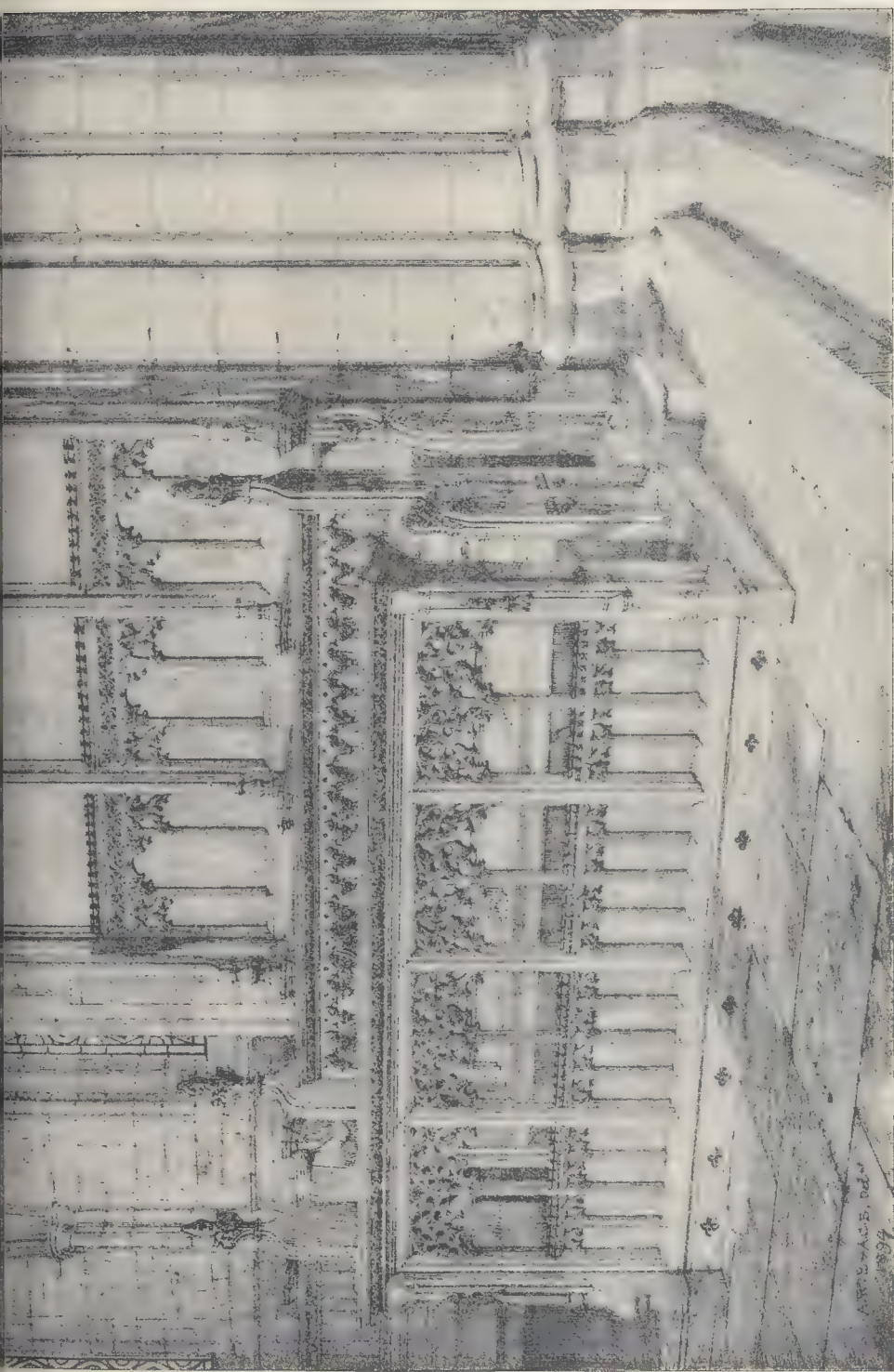




THE BUILDER, OCTOBER 27, 1934





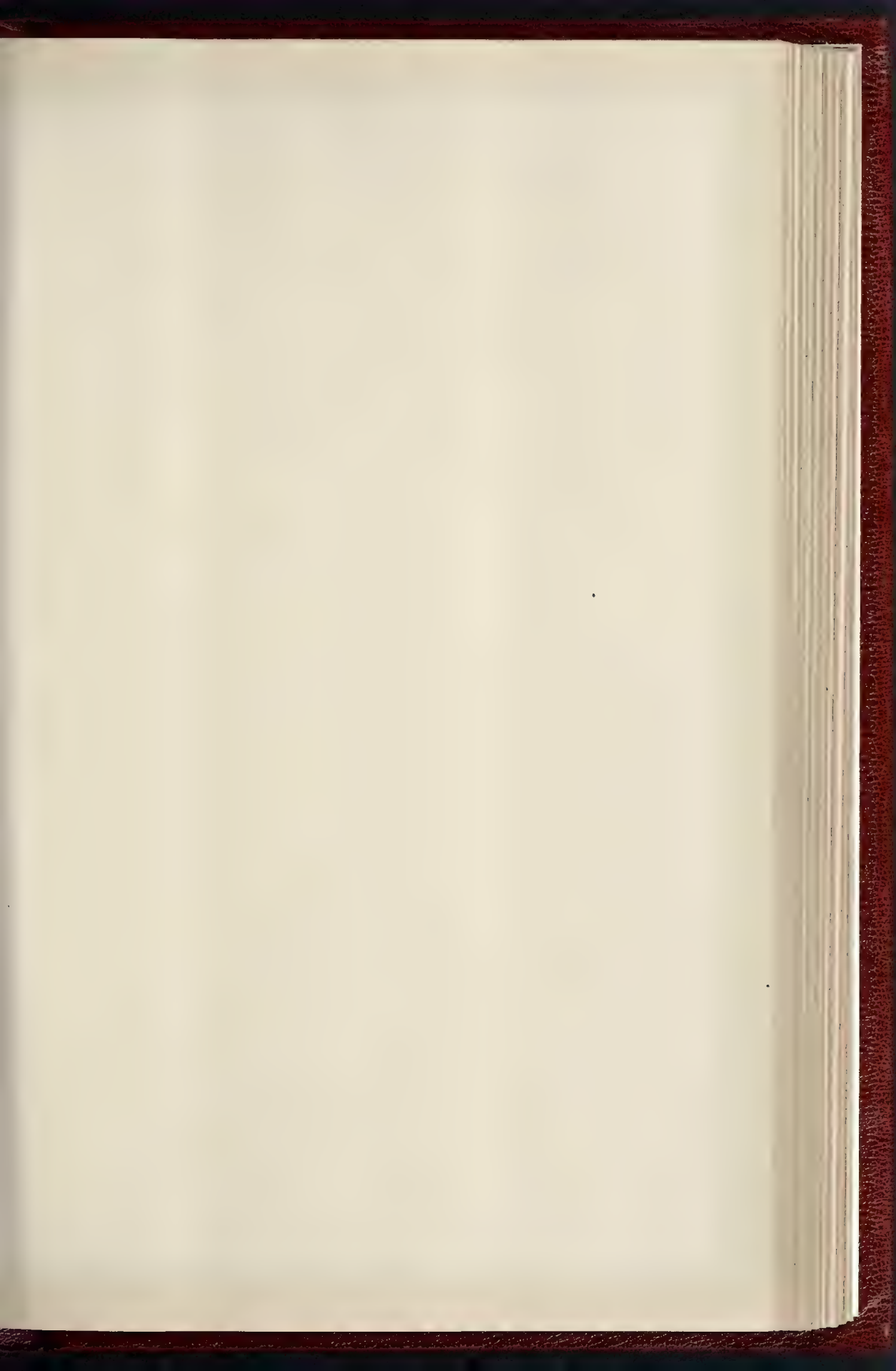


MEMORIAL STALLS, ST. SAVIOUR'S, SOUTHWARK.—SIR A. W. BLOMFIELD, A.R.A., ARCHITECT

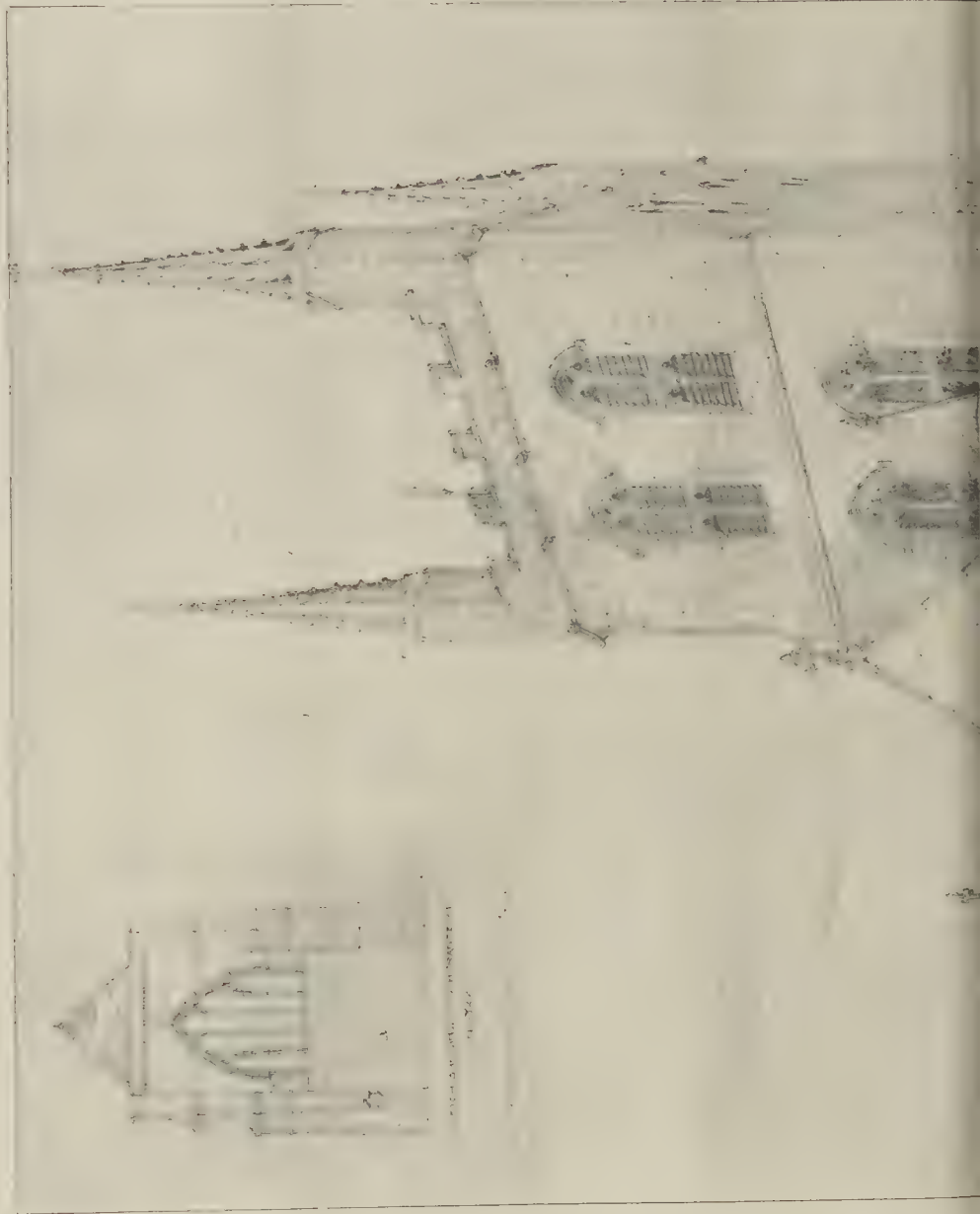
*Royal Academy Exhibition, 1894*



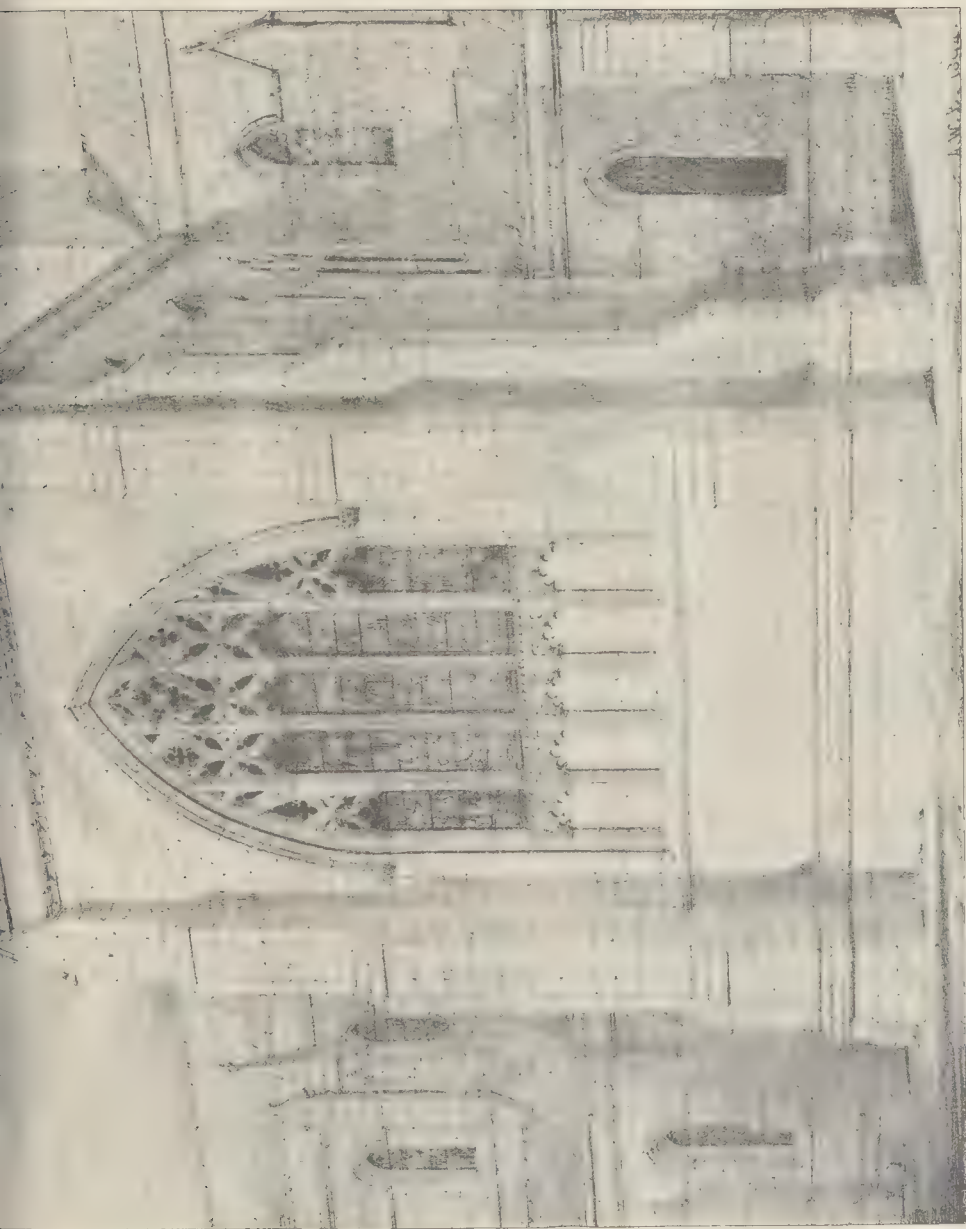




THE BUILDER, OCTOBER 27, 1894







NEW PHOTOGRAPHIC CO. LONDON. PRINTED BY JAMES B. HARRIS.

SOUTH TRANSEPT, ST SAVIOUR'S, SOUTHWARK. SIR A. W. BLOMFIELD, A.R.A., ARCHITECT.

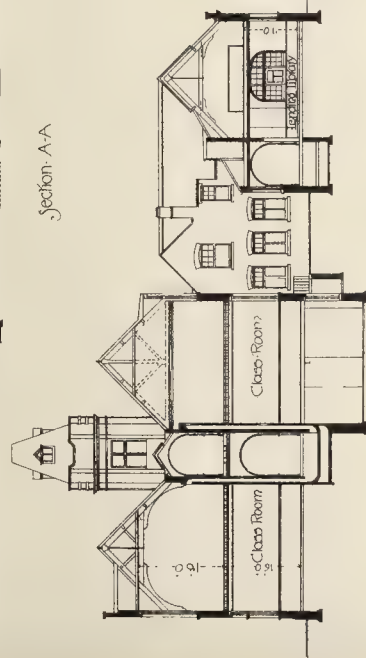
Royal Academy Exhibition 1894







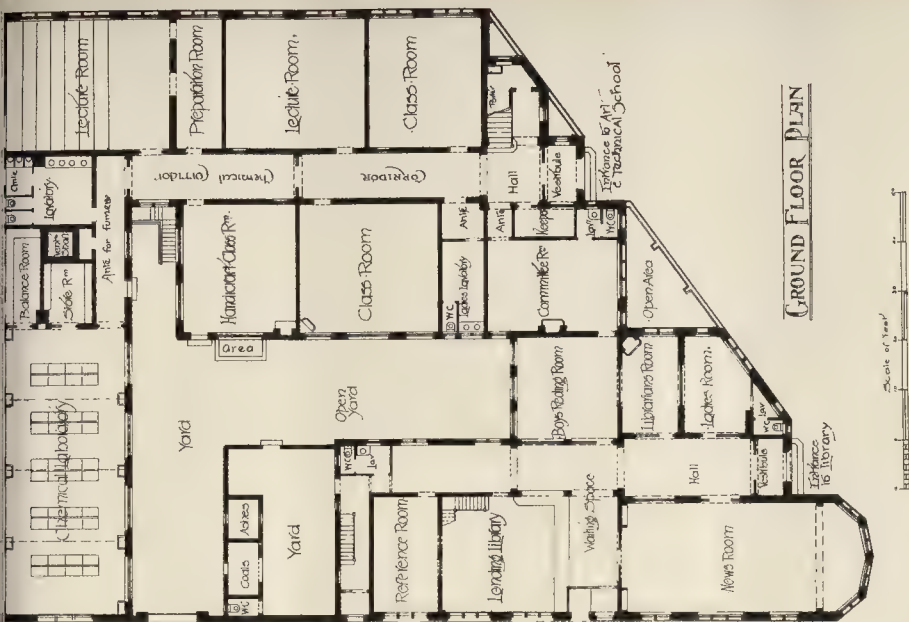
Section A-A



Section C-C



Section B-B







## THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

**Highgate Archway Improvement.**—The Highways Committee brought up the following report in reference to the Highgate Archway:—

"By Section 4 of the London County Council (Improvements) Act, 1894, the Council is authorised to widen and improve Archway-road (one of the main roads vested in the Council by the Local Government Act), and to alter and reconstruct the archway which carries Horseley-lane over the road. The cost of the work, which is to be carried out by the Council, is estimated at 27,000*l.*; and of his the Ecclesiastical Commissioners are to pay 4,000*l.*, and the remainder is to be paid in equal shares by the Council, the Middlesex County Council, the Vestry of Islington, and the Hornsey Local Board, but the contribution of each of the three latter is not to exceed the sum of 6,500*l.* After the completion of the reconstruction, the archway is to be maintained and repaired as a county bridge, at the joint expense in equal shares of the two Councils. Under our reference as to main highways, this improvement was arranged and agreed to be terms with the various authorities concerned, and it was on our recommendation that the Council obtained the necessary powers. We are, however, of opinion that the carrying out of the work falls within the province of the Improvements Committee, and we accordingly recommend—

"That it be referred to the Improvements Committee to carry out the Highgate Archway Improvement authorised by the London County Council (Improvements) Act, 1894."

The recommendation was agreed to.

**Water-supply for Urinals.**—The report of the Parks Committee contained the following paragraph, the recommendation being agreed to:—

"We have received a notice from the New River Company requiring the provision of a waste-preventing apparatus in place of the automatic tank at the urinal in Waterlow Park, and the provision of similar apparatus to each of the eleven water-closets at Lauderdale House, together with cisterns not capable of discharging more than two gallons of water at each flush, instead of three gallons as now. To carry out the works comprised in this notice will cause an expenditure of 15*l.* 10*s.* upon a building but recently completed. But apart from this, we are of opinion that a flush of not more than two gallons of water is distinctly insufficient, and that the adoption of such a small flush will seriously interfere with the efficiency of the sanitary arrangements. We recommend—

"That the Council do inform the New River Company that it is of opinion that a flush of water not exceeding two gallons, as required by the company, is insufficient for the conveniences at Waterlow Park."

**Tumulus, Parliament-hill.**—The following paragraph also occurred in the same Committee's report:—

"The Council is aware that the Committee has for some time past had in contemplation the question of opening the tumulus on Parliament-hill. Of what this mound may consist or what it may contain have long been subjects of speculation amongst antiquaries and specialists, and representations have been made with a view to the tumulus being opened in the interests of antiquarian and scientific research. We think that the opening of the tumulus would set at rest these speculations, and at any rate would indicate beyond doubt the original purpose of the mound. Mr. C. H. Read, of the British Museum, has kindly offered to gratuitously superintend the work. He has recently been engaged in directing the opening-up of an ancient Anglo-Saxon cemetery in South Sussex, and we consider it most desirable that the offer of Mr. Read should be accepted by the Council. We recommend—

"That the Council do approve of the opening of the tumulus on Parliament-hill under the superintendence of Mr. C. H. Read, of the British Museum, and that for this purpose we be authorised to expend a sum not exceeding 25*l.*"

The recommendation was agreed to.

**Sewer Ventilation.**—Lieut.-Col. Ford moved "that it be referred to the Public Health and Housing Committee to consider and report whether in certain cases the open gratings to the sewers in the public highways constitute such a danger to the public health as to render it desirable that the Council should consider the question of whether a remedy can be provided."

Mr. Burns, M.P., said that the more the sewers were ventilated the better for the health of the people. Where people complained of smells coming from the gratings, it was sometimes suggested that they should allow ventilating shafts in their back gardens or against their houses, but they usually were too short-sighted to permit such actions. It would be a good thing if the persons would allow shafts to be placed up the steeples of their churches.

Mr. McDougall explained that the Main

Drainage Committee had the subject under consideration. When they learnt from experts that sewer-gas was free from germs they were very much astonished. However, they had referred it to the experts to say whether sewer-gas was not injurious to health in some way other than through the presence of bacilli.

With the substitution of "Main Drainage Committee" for "Public Health and Housing Committee" the resolution was carried.

The Council adjourned soon after six o'clock.

## ARCHITECTURAL SOCIETIES.

**GLASGOW INSTITUTE OF ARCHITECTS.**—The annual meeting of the Glasgow Institute of Architects took place on the 16th inst. in the Religious Institution Rooms—Mr. W. Salmon presiding. The annual report stated that three new members had been admitted during the year. The number of ordinary members was now fifty-two, and of honorary members five. The conditions of competition, it was mentioned, for the Govan Congregational Church, Public Hall and Free Library for Kirkcaldy, and Paisley Grammar School and Academy were under consideration by the Council. The Royal Institute had agreed to place the Glasgow Institute on the same footing, as regarded its Council, as that held by the Royal Institute of Ireland. The Standing Committee on Public Architecture have had under consideration the designing of the public buildings of the city, and on their initiative the Council of the Institute are in correspondence with the Lord Provost on the subject. The Council had also asked the Police Commissioners to exhibit the plans of the bridges proposed to be erected over the Clyde. The Chairman said it must be to the public advantage that architects of the greatest experience should be appointed to design and superintend their public buildings. The employment of independent architects would not cost a penny more than the present system. If this course were pursued, all their public buildings might be more worthy of their city, in whose welfare and advancement they were all interested. Why should not every building erected with the citizens' money possess those qualities of fitness and beauty which would command for them the praise of future generations? The report and accounts were approved of, and the members of the Council were afterwards elected.

The first meeting of the newly-elected Council was held in the chambers of Messrs. MacLean, Fyfe & Maclean, writers, St. Vincent-street, on the 23rd inst., when the office-bearers for the ensuing year were elected as follows:—President, T. L. Watson; vice-president, J. J. Burnet; auditor, David Thomson; hon. treasurer, Alex. Petrie; secretary, C. J. Maclean, writer; members of Council, T. L. Watson, Alex. Petrie, Henry E. Clifford, John Keppie, John B. Wilson, J. M. Monro, A. G. Thomson, John Thomson, John James Burnet, J. A. Morris (Ayr), and George Bell. The committee for the year were also appointed. The attention of the Council was called to the restoration of Glasgow Cathedral at present being carried out, and Mr. J. Honeyman, A.R.S.A., made a statement on the subject. A committee was appointed to examine the Cathedral, and take such action as they thought necessary.

## Books.

**A Text-Book on Roads and Pavements.** By FRED. P. SPALDING, Assistant Professor of Civil Engineering in Cornell University, Member American Society of Civil Engineers. New York: John Wiley & Sons. 1894.

"I AM am of this book," so the author states in his preface, "is to give a brief discussion, from an engineering standpoint, of the principles involved in highway work." Much space is occupied with considerations as to the location of new roads, and as to changing the location of existing roads. This is to be expected in a work dealing with a new country, where new centres of industry are constantly springing up, necessitating increased means of communication. Both as regards the construction of new roads, and the maintenance of old ones, the paramount necessity for thorough drainage is again and again emphasised. Reiteration appears to be somewhat of a weak point with the author, but in the present instance the end must justify the means.

The methods of construction and the advantages and disadvantages of the various forms of

road surface are discussed in a rather tentative style.

In reference to the construction of macadam roads, it is stated that "Where no roller is used, the stone is usually spread on the surface of the road-bed to the full thickness desired for the road, and left to the action of the traffic." Surely such a practice cannot be defended, either as being economical or convenient. With regard to uniformity in the size of road-metalling—a most important point in road-construction and maintenance—the following remarks are worth quoting: "The best practice seems to favour the exclusion of the fine material from the stone, without insisting on too great uniformity in size (stones being allowed, probably, from 3 in. to 1½ in. or 2 in. in dimensions), and then adding small material after the placing of the stone upon the road to assist binding."

Under "Binding Material" the author says: "The voids in loose broken stone comprise about 40 to 50 per cent. of the volume. In the stone when compacted in the road the voids are somewhat reduced, probably ranging from 30 to 40 per cent. of the volume."

All stone, not ideally perfect, contains a variable quantity of binding material, which quantity is increased during the process of consolidation. An experiment such as is described in the text would, therefore, give little clue to the proportion of binding material to be added, which would certainly never approach to 30 or 40 per cent.

According to Mr. T. Codrington, M. Inst. C.E.:—"Assuming, as experiments show, that broken road materials contain 55 per cent. of solid stone, a cube foot composed of broken stone, which weighs in the solid 172 lbs., per cube foot, will weigh 172 × 0.55, or 94½ lbs. By the process of consolidation in the road, it is crushed and compressed together till it weighs, as in the roads above referred to, say 162 lbs. per cube foot, and the bulk it then occupies must be in the inverse proportion, i.e.,  $\frac{172}{162} = 0.583$ , or 58 per cent.

of its bulk before it was spread on the road. Or, put in another form: it takes nearly 1½ of road-metalling, measured by bulk or thickness, to make 1 of consolidated road surface." The voids in consolidated broken stone are, therefore, reduced to about 53 per cent., and this exactly coincides with steam-roller experience.

During his consideration of the various systems of road management the author makes some very practical remarks, which, although specially referring to America, are worthy of consideration by English County Councils before deciding to undertake the direct management of their roads.

The character of this little book is not unlike that of Captain Roland as described by his brother in "The Caxtons."—"Roland beats about the bush till he sends out the very bird that we want to search for. He is never in the wrong without suggesting to us what is the right."

**The "Practical Engineer" Pocket-book and Diary for 1895.** Edited by W. H. FOWLER, M.I.M.E. Technical Publishing Co., Limited, Manchester.

This little pocket-book contains all the tables and general information that a mechanical engineer is likely to require, besides a large number of diagrams, many of which are really working drawings.

Although pocket-books are only generally used for reference, yet anyone who would take the trouble to carefully read them through, with the purpose of committing to memory the more important formulae and data, would be surprised to find what a large amount of knowledge he had acquired by so little trouble.

Such books do not, of course, treat any subject exhaustively, but they give the results, expressed in formulae or otherwise, of those who have done so, and may therefore be regarded, more or less, as a royal road to knowledge. Information obtained in this way is, of course, only superficial, and it is most desirable to verify the results for oneself as far as possible, but in every-day practice it often proves of the greatest importance to have the data such as these pocket-books contain at your finger-ends, although one may not be able to deduce, step by step, the many formulae given throughout their pages.

**Roof Carpentry.** By GEORGE COLLINGS, London: Crosby Lockwood & Son.

This is a very elementary work, and by no means deals, as the preface would seem to imply, with "the framing of wood roofs of almost every



description." For a book intended for very young students, there are too many examples of construction that are bad in principle, but which the author thinks that practice justifies. Indeed, with the usual bias of a *soi-disant* "practical man," he exalts practice over theory, heedless that practice and theory are always at one, when the practice is correct and the theory complete. In some points the book is good and up-to-date; thus the account of scarfing is in consonance with modern needs and modern capabilities. The most useful part of the book to a young carpenter is the chapter on hip-roofs, in which the method of finding bevels and cuts is clearly and correctly described.

*The Practical Plasterer.* By WILFRED KEMP. London: Crosby Lockwood & Son.

A MODEL of what a book on technical subjects ought to be, in which, as far as the space allows, not only the rudiments of the plasterers' craft are explained, but the higher branches, as modelling, casting, stucco-duro, gesso, and sgraffito, are clearly and adequately described. In short, it is a book that should be in the hands of every plasterer, and would be of high value to every architectural student.

*Theoretical Mechanics. Solids.* By J. EDWARD TAYLOR, M.A., B.Sc. London. London: Longmans, Green & Co.

NUMEROUS as books on mechanics have now become, there is yet room for one which treats the theoretical part of the subject as clearly as does the present. Advanced mathematics are excluded, and a knowledge of the elements of algebra and geometry is sufficient to enable a student to follow the reasoning and calculations, and as the work is intended to serve as a textbook for the Science and Art Department's examinations, as well as for London University matriculation, and can be recommended as amply sufficient for both, it is clear that, within its prescribed limits, the subjects are adequately dealt with in this book.

*Mensuration Made Easy; or, The Decimal System for the Million.* By CHARLES HOARE. London: Effingham Wilson & Co.

A COMMENDABLE attempt to provide instruction with practical illustrations for those whose education has been neglected in the direction of decimal fractions and mensuration; but in the twentieth edition there are unexpected instances of careless editing—as, for example, in the rule for the cubic contents of a sphere, the multiplier is given as '5236, and in the example worked out the more accurate figures '523577 are given without explanation. In the figuring of this example there is a misprint of 1 for 3, which might puzzle the class of student for whom the *brochure* is supposed to be intended. Again, the multiplier for cubic yards is given on one page as '03703, and on another as '03704.

*A Key to Carroll's Geometry.* London: Burns & Oates, Limited.

"CARROLL'S GEOMETRY" is so well known and so widely used that a key to the more advanced parts, orthographic projection and solid geometry, will be of value to those students who are studying without a tutor. At the same time, the assistance given is ingeniously arranged to prevent the encouragement of idleness by removing all necessity for the student's own application and thought.

*Hood on Warming Buildings by Hot Water.* Re-written by FREDERICK DYE. London: E. & F. N. Spon.

A WORK of so great authority as "Hood on Warming" needed but to be brought up to date to maintain its high position. This has been most ably done by Mr. Dye, with the result that we have now as good a guide to the practice of hot-water heating, at least by the low-pressure system, as can be desired. The main points of the high-pressure system and warming by heated air are explained, though not so fully as those of the low-pressure method. Valuable information is given also on the various classes of apparatus for the supply of hot water for domestic and other purposes, being in fact the series of papers contributed by the author to the *Builder*, and reprinted by permission. A short chapter on ventilation serves to point out some of the rudimentary principles, but the space allotted is

insufficient to allow of the subject being fully treated.

*Heating by Hot Water.* By WALTER JONES. London: Crosby Lockwood & Son.

ALTHOUGH a "trade" book, and although Messrs. Jones & Attwood's work is chiefly on the low-pressure system, we have here very useful information on the fundamental data which are necessary in determining the efficiency of hot-water apparatus. The points of difference and the relative merits and demerits of the rival systems of high and low pressure are fairly dealt with, as are also, allowing somewhat for trade bias, the advantages and defects of different types of boiler. Amongst the most valuable portions of the book are the precautions to be observed in order to ensure safe and efficient working of various apparatus.

## Correspondence.

To the Editor of THE BUILDER.

### VENTILATION.

SIR,—The thanks of all who are engaged in solving the problem of continuously reliable ventilation on a scientific basis are due to the *Builder* for the timely exposure of the means employed by a certain trading firm, which, in addition to distributing broadcast the anonymous pamphlet referred to (page 273 ante), appears to have secured influence over some periodicals professing to record scientific or official views, to such an extent that the editors persistently decline to give place in their pages to facts which refute the misleading statements they publish.

If these pamphlets and articles were seen only by architects and the public who take the trouble to examine what is actually accomplished by "mechanical ventilation" properly applied, little harm would result, but being artfully compiled with the express purpose of deceiving the unthinking, it is hoped to bolster up a trading concern which is evidently alarmed at the truth becoming known that the "plenum principle" rightly applied is a decided success, and is becoming rapidly adopted for every class of building.

The personal attack upon my doings in connection with the New General Hospital, Birmingham, is beneath contempt, and only calls for remark because, if others are misled thereby, the public health may suffer, and money will be wasted upon appliances which principally benefit those who, by discreditable means, induce the ignorant to employ their wares.

WILLIAM HENMAN, A.R.I.B.A.

\*\* The arrangement by which people of a certain class get puffing in papers of a certain class, to which Mr. Henman alludes, is simply an exchange of "puffs" for advertisements; i.e., an advertisement is given to the paper on an understanding that articles in favour of the advertiser's goods are to be inserted on convenient occasions. We know all about it, because it has been occasionally tried on us—what success, those who have made the attempt best know. This sort of thing is contemptible enough in any case, but when it comes to subjects so important as the sanitation of hospitals, &c. (a matter, one may say, of life and death), it is simply disgraceful. We only wish that we could publicly expose by name the firms and the papers carrying on this kind of conspiracy to gull the public; but the law of libel is such that those who would be glad to protect the public from imposition are prevented from doing so. We have received one or two other very strong letters on the subject, in addition to Mr. Henman's.—ED.

### BRICKS.

SIR,—It is very easy to be wise after an event; so probably thought the big men in the brick trade whom a few years back formed a ring to raise prices and restrict production, with the result that bricks have ever since come from the Midlands. I am not interested in the brick business, but very much in bricks, and from my experience I should prefer the old stock if well burnt, as the best material to resist both fire and the eroding effects of other elements.

To get a good red brick is still difficult; the bright reds made mainly from the Thanet or Bagshot sands are attractive but not durable; those brought from distant parts are pressed smooth, and in colour not quite satisfactory—a good cherry red combined with durability, as yet the Mecca of brick manufacture.

I have recently made diligent search, but, although I could not find a red to my mind, I found a primrose-coloured brick of great promise manufactured by the Gray's Chalk Quarries Company. These if

laid with a neat, closely-cut joint, would make a very good quoin and dressing to openings, much resembling the Ruabon bricks used for such purposes in Wales, and, as a wall facing, would look very pretty. Others of a somewhat similar colour there are with a vitreous surface, and some made from pulverised flint.

I merely make these notes for the information of the profession. T. E. KNIGHTLEY.

### WATER LODGING ON MEETING-RAILS.

SIR,—May I make a suggestion to manufacturers of window-sashes? In certain states of the atmosphere in a room a quantity of moisture forms on the glass and settles as water on the lower rail of the upper sash, which it thus helps to decay. I suggest that this rail should be sloped, and that the top of the upper rail of the lower sash should also be sloped to meet it, so that a kind of channel would be formed by the two. The water would run off between the two rails as soon as the window was opened. Where there are cross-bars, and at the lower bar of the lower sash, I think that with the same object it would be an improvement if all grooving and other ornamentation were dispensed with, the parts being sloped with a plain surface.

### THE ACTION OF LIME ON LEAD.

SIR,—In looking through some of your back numbers the other day I caught sight of the statement that lime acts injuriously on lead. It struck me that if this is the case many an old soil-pipe built into the wall with lime mortar must be in a bad condition. Can any of your readers relate their experience? In removing old lead soil-pipes thus built in, have they noticed them eaten away? N. V.

### COLOURING PLANS ON DEEDS.

SIR,—In reply to E. H. After inking in the plans on the parchment mix some powdered alum with a drop of water and apply it with a brush to the parts to be coloured. When this has dried any superfluous alum can be lightly brushed off, and the colour will flow and lie on as evenly as on paper.

G. W. LEIGHTON.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XVII.

PIPES.

WATER is conveyed in the various stages from the source to the consumer by means of open channels, tunnels, and culverts, or by pipes of cast or wrought-iron, steel, lead, clay, and wood. Where the water is conveyed under pressure, pipes must be used, and they are generally more convenient and economical in construction. The thickness of the shell of the pipe, and the form of joint, depend upon the material employed, the capacity, and the pressure it will be required to withstand. In calculating the thickness of the shell, sufficient allowance must be made for imperfect workmanship, shock in handling and laying in the trenches, and the weight of the superincumbent earth, and traffic they will have to support, as well as the great strain which may come upon them on account of the sudden opening or closing of valves.

The bursting strength of pipes is found by the following formulae:—

$$(1) p = s \times \text{hyp. log. } R. \quad (2) s = \frac{p}{\text{hyp. log. } R}$$

$$(3) \text{Hyp. log. } R = \frac{p}{s}$$

Where

$p$  = the internal pressure in tons per square inch  
 $s$  = the maximum tensile stress in tons per square inch—7 tons being usually adopted as the value for cast iron.

$R$  = the ratio of the outside diameter to the inside diameter.

A high factor of safety must be used adequately allow for the strains imposed on the metal. Empirical formulae based on practice are found to be more convenient for the purpose of determining the thickness of metal. The formulae are numerous and widely divergent their results, but the following, suggested by the late Mr. J. La Trobe Bateman, has been found work well in practice:—

$$t = 25 + \frac{Hd}{9600} \text{ where}$$

$t$  = the thickness of the pipe in inches.

$H$  = the head of pressure in feet of water.

$d$  = the inside diameter of the pipe in inches.

The following table has been calculated from



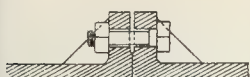
his formula for a head of 300 ft. of water-pressure:

Internal diameter.	Length, not including socket.	Thickness, inches and decimals.	Nearest thickness in 16ths of an inch.	Weight, including socket.	Exhausting pressure per square inch.	Factor of safety for 16 lbs. per square inch.	Weight of Lead Joint.
n. ft.	in.			cwts. lbs.			lbs.
2 1/2	6	3/16	9	418	4,950	38	1 1/4
3	6	3/16	9	525	3,920	30	1 1/2
3 1/2	9	3/16	9	1,065	3,920	30	2 1/2
4	9	3/16	9	1,388	2,940	23	4 0
5	9	4/16	10	2,011	2,744	21	5 0
6	9	4/16	10	2,388	2,290	18	6 5
7	9	4/16	10	3,171	2,240	17	7 7
8	9	5/16	11	3,599	1,950	15	8 2
9	9	5/16	11	4,555	1,950	15	10 4
10	9	5/16	11	5,093	1,784	14	11 5
11	9	5/16	11	5,551	1,661	12	13 5
12	9	5/16	11	6,069	1,633	13	18 0

As absolute correctness cannot for practical reasons be attained, it is usual to allow a deviation of 3 per cent. in the calculated weights.

Cast-iron pipes are connected by means of flange-joints bolted together, by spigot and socket joints run solid with lead, &c., or the spigot is turned and the socket bored out to receive it. The flange-joint (fig. 43) is stronger

Fig 43



than either of the latter, but is more costly, and is rarely used when the pipes are laid horizontally in trenches except for high pressures. It is chiefly used where the pipes are fixed vertically for stand-pipes, &c. The faces are machined and jointed together with red-lead or with packings made of lead, rubber, or other material.

The proportions of cast-iron flanged-pipes are given in the following table:—

Internal diameter of pipes.	External diameter of flange.	Centre to centre of holes.	Thickness of flange.	No of bolts in flange.	Diameter of bolts.
In.	In.	In.	In.	In.	In.
2	6	4 1/2	1 1/4	4	1/2
3	6 1/2	5 1/4	1 1/4	4	5/8
4	7	5 3/4	1 1/4	4	5/8
5	8 1/4	6 3/4	1 1/4	4	5/8
6	9 1/4	7 3/4	1 1/4	6	5/8
8	11 1/4	9 3/4	1 1/4	6	5/8
10	13 1/4	11 3/4	1 1/4	6	5/8
12	15 1/4	13 3/4	1 1/4	8	5/8
14	17 1/4	15 3/4	1 1/4	8	5/8
16	19 1/4	17 3/4	1 1/4	10	5/8

Spigot and socket joints with lead, rust rubber, turned and bored joints take several forms.

Fig 44



Fig. 44 is the joint adopted in the Tansa new works for supplying Bombay. Fig. 45a, 45b are

Fig 45 (a)



Fig 45 (b)



equally used, the former having the advantage of preventing blown joints, owing to the resistance offered by the bead on the spigot and the recess

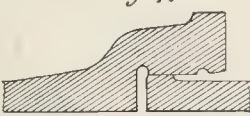
in the socket. The socket space for jointing should not exceed 1/4 in. in thickness in pipes up to 3 in. diameter, 1/8 in. from 3 to 8 in. diameter, and 3/16 in. from 8 to 12 in. diameter. Rust joints are rarely adopted for waterworks, and when used under special circumstances they do not differ from the forms shown for lead. They are made by forcing a mixture of iron borings or turnings and sal-ammoniac into the space between the socket and spigot. Rubber joints (fig. 46), known

Fig 46



as Foster's patent, are largely used for temporary purposes in the North of England. Two beads are cast on the spigot end between which one or more circular rubber rings are placed and then driven into the socket. Turned and bored joints (fig. 47) have been extensively used in the North

Fig 47



of England and abroad, but only in a few instances in the South of England. Pipes jointed thus must be laid in straight lines, with expansion joints or ordinary spigot and socket lead joints every tenth pipe to allow for the variations in temperature. The half turned and bored is generally used, so that lead may be inserted if deemed necessary. The taper of the machined portion should not be less than 1 in 32, and the width should not exceed 1 in. An increased width causes greater rigidity, rendering the work more liable to fracture by the traffic and superincumbent earth. Cast-iron pipes should be made from the grey variety, of good tough quality, which should be re-melted in a cupola before running. The increase in strength and density caused by re-melting is strikingly illustrated by the results obtained by Sir Frederick Bramwell with Acadian cold blast iron, as follows:—

SAMPLES.	TENSILE STRENGTH PER SQ. IN.
1st Samples.....	7 1/2 tons.
2nd " after 2 hrs. longer fusion	8 3/4 "
3rd " after 12 hrs. longer fusion	10 8 "
4th " re-melted with fresh pigs	11 10 "
5th " after 4 hrs. longer fusion	18 5 "
Maximum of 5th samples.....	19 6 "

the tensile strength being increased 150 per cent. by eight hours of continued fusion. A clause should be inserted in a specification for cast-iron pipes providing that a test-bar cast from time to time shall, when placed edgewise on bearings 36 in. apart, support a certain weight.

Test-bars 1 in. x 2 in. in section and 3 ft. 6 in. long should be capable of supporting a weight of 35 cwts. gradually applied at the middle of the bar. Pipes should be cast socket downwards in dry sand-moulds, and run, as quickly and equally as possible, in one operation, so as to avoid a "cold shot." Pipes 4 in. and upwards in diameter should be cast vertically; under 4 in. at an angle of 45 deg. The strength at the spigot-end is increased by casting a head or additional 6 in. or more beyond the finished length of the pipe, which is afterwards cut off in the lathe. The head has the effect of compressing the metal, and permits the ash and bubbles to rise into and be removed with it. The pipes should be straight, cylindrical, and free from chaplets, core nails, and other imperfections, and the metal should be of uniform thickness throughout. The consecutive number, year, and maker's name should be cast on each pipe, the numbers on rejected pipes being disfigured by a chisel-cut, and no number of a rejected pipe must be replaced.

THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—The following gentlemen, having satisfied the examiners at the examination held in Birmingham on October 2 and 6, have been granted the Association's certificate:—James G. D. Armstrong, Henry G. Bradshaw, Amos Burton, junr., William S. Green, Edward W. Hickes, Albert H. Hughes, Edward B. Newton, James Openshaw, William A. Palliser, Joseph Perkins, William Slater, Frederick Thackeray, and Frank Worrall. The next examination will be held in London on April 5 and 6, 1895.

# OBITUARY.

MR. H. TAYLOR.—Mr. Henry Taylor, master builder, Pontefract, died very suddenly on the 15th inst.

MR. E. CLARK.—Mr. Edwin Clark, M.Inst.C.E., who died at his residence, Cromwell House, Marlow, on Monday night, was born in Marlow in 1814. According to the *Daily News*, he acquired a taste for mathematics and engineering, and at the time of the railway mania gave up a mathematical master-ship he held to enter the engineering profession. He attracted the attention of the late Sir Robert Stephenson, and on behalf of his master he carried out the drawings and experiments for the Conway and Britannia Bridges, and as Resident Engineer had control of the building of those bridges. Mr. Clark was for many years Chief Engineer to the Electric Telegraph Company. He invented and patented the hydraulic graving dock and canal lift. He constructed the great dock at Bombay, and others at Malta and London. He was the designer of many bridges, including the great swing-bridges at Arnhem, Lyons, and Rochester, the Aire Tubular Bridge, and the Scarborough Viaduct. He was the original inventor of the block system of signalling. Mr. Clark also laid the cable from Dungeness to Holland, and negotiated the agreements and erected the telegraph for the chief English railways. He was engineer to the Crystal Palace Company, and completed the building of the Palace after the fire. He was engineer of the grand harbour of Callao, in Peru, and of the pier and wharves at Colon. He was a pioneer in the practical application of pneumatic transit, and carried out the first application of the electric light to lighthouses. Mr. Clark afterwards undertook many important contracts, including the building of the marine canal from Cronstadt to St. Petersburg.

## GENERAL BUILDING NEWS.

WEDGWOOD INSTITUTE, BURSLEM.—The Wedgwood Institute, the additions to which were formally opened on the 15th inst. by the Princess Louise, originally comprised a school of art, a laboratory, and a free public reading-room and lending library, the Free Libraries Act having been adopted by Burslem the first of the Potteries towns. The first floor was devoted to art class-rooms and a museum, whilst the second floor was devoted to science classes. The additions to the Institute, which have been designed by and carried out under the superintendence of Messrs. Ford & Slater, architects, Burslem, comprise two blocks of buildings; of these one is on the Baker-street side, and is three stories in height, with basement in addition. The ground floor comprises two large modelling-rooms, on the first floor is an antique class-room, above which is a large laboratory, in connexion with which is a lecture theatre, class-rooms, balance-room, and master's-room. Several years ago, owing to the liberality of Mr. W. Woodall, M.P., a museum was erected at the rear of the Institute, but this has been removed to another position, and the building is now utilised partly in connexion with the School of Art, and partly by the Science Department. The second block of buildings referred to is on the Brickschouse-street side, and is four stories in height, and this on the ground floor provides a large reference library and an extensive department for the librarian, the reference library being so arranged as to be in connexion with the reading-room. On the first floor is a large class-room for elementary art, whilst on the second floor are provided two class-rooms for technical instruction, and on the top floor is a gymnasium, or it might be used in conjunction with the technical schools. On the Baker-street side the architects have purposely had regard to plainness of design, inasmuch as this portion of the building is somewhat excluded from view; but the elevation in Brickschouse-street is carried out to accord with the original part of the building so far as its height extends, but in order to gain as much room as possible, this addition to the Institute is carried up considerably higher than the original building. The walls of the buildings throughout are of red brick with strings and dressings of terra-cotta, the floors being of fireproof construction, of tiles laid on concrete resting on iron girders. The various rooms are warmed by hot water on the low-pressure system by Mr. W. Boulton. The building contracts have been carried out by Mr. Wm. Grant and Mr. W. Cooke, builders, of Burslem. The cost of the additional buildings, including fittings and heating, including also several alterations in the redecoration of the original buildings, is upwards of 5,000.

SCHOOLS, LANGHAM, NORFOLK.—At a meeting of the newly-formed School Board, held at Langham on the 2nd inst., after considering several applications, it was resolved that Mr. Herbert J. Green, architect, of Norwich, be employed to submit plans for, and superintend the erection of, new schools, to be built at Langham for the Board.

SCHOOLS, HARWICH.—The Harwich School Board have given instructions to Mr. J. W. Start, F.S.I., architect, Harwich, to prepare plans for an infants' school to accommodate 150 children at Lower Dovercourt, this being the second block of buildings undertaken by the Board.

TECHNICAL SCHOOLS, MAIDSTONE.—On the 16th inst. the Duke of Cambridge opened the new



Technical Schools which have been built by the Maidstone Corporation. Architecturally the exterior of the Schools harmonises with the Museum, but the entrance is to be distinctly separate. The accommodation provided under the various departments is as follows:—1. In the Basement—Workshops, Heating Apparatus, and Storage. 2. On the Ground-floor—Entrance-hall, Library, Physical Science Lecture-room, Lecturer's Preparation-room, and Student's Laboratory, Wood-carving-shop, Chemical Laboratory, large Lecture-room, Science Class-rooms, Masters' Room, and Store for Apparatus. 3. On the First Floor—Landing and Upper Hall (forming Picture Gallery), Committee-room, Art Master's Room, Elementary Art Classroom, Antique Studio, Modelling-room, and Cast-store. All the studios have north or north-east light. The electric lighting machinery is accommodated in a separate building. The buildings are designed as part of a plan for the extension and completion of the Museum on the lower side by building a new Curator's house at the extreme west end, fronting St. Faith's-street, and erecting an extension of the Fine Art wing of the Museum on the site of the present house. This will form a second forecourt, of which the school entrance will form the north, and the Curator's house and new Museum wing the west and east flanks respectively. The entrance-hall of the schools will eventually be in communication with the Museum. The designs were prepared by Mr. Albert W. Smith, of the firm of Messrs. Ruck & Smith, Maidstone, and the contracts have been carried out as follows: general building, Messrs. Wallis & Sons; plumbing work, Mr. H. Brennan; heating apparatus, Messrs. Pryer & Co.; electric lighting, Messrs. Laing, Wharton & Down, London.

**GRAMMAR SCHOOL, PAISLEY.**—Plans of the new Grammar School, Paisley, have been accepted by the Burgh School Board, the successful architect being Mr. T. G. Abercrombie. There were several competitive sets. The building, which is estimated to cost about 19,000l., will be erected at Crossflat, Glasgow-road. The edifice will be three stories in height, erected in the form of a square, which will be roofed over. The main entrance is embellished by a large portico, and the outline of the building is relieved by a tower rising on the right. On the ground floor are the rector's, visitors', and other accommodation, also the library, juniors, English, and initiatory departments. Upstairs needlework will be taught in a specially-arranged apartment, while rooms will be provided for teaching classics, modern languages, mathematics, &c. On the second floor students in science and art (including drawing, painting, and modelling) will be located, the advantage of top light from the north being available. There is also special accommodation for cookery lectures, and rooms are set apart as laboratories and for preparation purposes, together with one for lectures on science subjects. The enclosure above referred to as roofed over forms a hall, which will be used for drill, or on the occasion of examinations. *(Signed) H. Wall.*

**SCHOOL BUILDINGS, BURLINGTON CHAPEL, IPSWICH.**—The memorial-stone was recently laid of an addition to the Baptist's school-room of the Burlington Chapel, Ipswich. The building is intended for infants' school and class-rooms. It is connected with the old room by a corridor and staircase hall, from which is approached the new infants' school-room—a room 25 ft. by 20 ft. Also approached from the hall is a copper room and china store. Upstairs is a ladies' room, 22 ft. by 16 ft., five new class-rooms, two being made in the place of the old staircase, which has been removed. On opening the revolving shutters and taking in part of the old building, a room is available 41 ft. by 18 ft., and on closing the shutters it is converted into three class-rooms. The entrance will be from London-road, which will be faced with eight windows. The plans were prepared by Messrs. Eade & Johns, and Mr. E. Catchpole is the builder.

**NEW OPERA HOUSE AT WAKEFIELD.**—The New Royal Opera House, Wakefield, situated in Westgate, has, says the *Leeds Mercury*, been erected by Mr. B. Sherwood, from the designs and under the personal supervision of Mr. Frank Matcham, of London. Mr. J. P. Briggs, of London, acting as clerk of works. The building is practically fireproof. The corridors and staircases being constructed of iron and concrete. The galleries are built on the cantilever principle, and every person will have a full view of the stage. The auditorium is a large one, and is arranged as pit-stalls and pit on ground floor, the first floor has two private boxes, dress circle, and upper circle. The second floor is devoted to the gallery. The auditorium is wholly cut off from the stage by a thick proscenium-wall rising above the roof, and every opening is fitted with a self-closing iron door, and the proscenium with a fireproof curtain. The decorations, consisting of ornamental plastic work, have been carried out by Messrs. De Jong & Co., London, the prevailing colours being light blue, cream, and gold. The lighting arrangements have been entrusted to Messrs. Tollerent & Co., Leeds.

**RESTORATION OF ST. MARY'S CHURCH, BAGLIT, FLINTSHIRE.**—This church is now undergoing considerable restoration at the hands of Mr. Richard

Jones, contractor, from plans prepared by Mr. Pete Bibby, of Flint. The renovation includes the complete reseating of the church and other internal improvements.

**TEMPERANCE HALL, LISKEARD, CORNWALL.**—After undergoing alteration and renovation, the Liskeard Temperance Hall was reopened by the Right Hon. Leonard Courtney, M.P., on the 22nd inst. The work has been carried out by Messrs. Reynolds & Elliott, of Liskeard, from the designs of Mr. Sansom.

**COTTAGE HOSPITAL, PORTH, GLAMORGANSHIRE.**—The memorial-stones of the Porth Cottage Hospital were laid on the 18th inst. The building is being erected on an elevated position on Cemetery-road, overlooking the valley. The contract is being carried out by Messrs. Charles Jenkins & Sons at a cost of 5,500l. 10s., and under the superintendence of Mr. F. Gibson, architect, Pontypridd.

**NEW SCHOOLROOM, ELLESMERE COLLEGE, SHROPSHIRE.**—On the 18th inst. the Duke and Duchess of Devonshire laid the foundation-stone at Ellesmere College, Shropshire, of a new schoolroom. The new schoolroom is to be built from the designs of the college architects, Messrs. Carpenter & Ingelow. It will be 120 ft. long and 36 ft. wide, with a hammer-beam roof rising 50 ft. Ten large class-rooms will open out from the sides.

**NEW CHURCH, BESSINGBY, NEAR BRIDLINGTON, YORKSHIRE.**—The consecration by the Archbishop of York of the new church of St. Magnus, Bessingby, took place recently. The church, which has been designed by Mr. Temple Moore, of London, is in the Decorated style, and consists of nave with north and south aisles, chancel, vestry, and a central tower and spire, and is designed to seat 150 persons. The arches in the chancel and nave are of Ancaster stone, springing from pillars and piers of red Dumfries stone. The roof is panelled and decorated throughout. The east window represents the Crucifixion, and there are four other memorial windows. The pulpit, reading-desk, lectern, choir stalls, and pews are all in stone. The chancel floor is laid with black and white marble. There is also an organ by Messrs. Hill & Son, of London. All the internal fittings and the organ are the gift of Mr. Alfred Wright. The contractor for the work is Mr. J. Rennard, of Bridlington Quay, the oak fittings being made by Mr. Shephardson, of Driffield. The whole of the stained glass has been supplied by Mr. H. Victor Milner, of London.

**ALL SAINTS' CHURCH, GOODMANHAM, YORKS.**—The ancient Church of All Saints, Goodmanham, was reopened on the 20th inst. by the Archbishop of York. The church consists of a Norman western tower and nave, with north aisle of a Transitional character. The chancel is thirteenth century, and the original narrow Norman chancel arch is still remains. The present work has been confined to the refitting and repair of the nave. The plaster ceiling has been removed, exposing to view a simple seventeenth-century oak roof. The nave floor has been lowered to its original level and repaired, and the nave re-seated with simple oak benches. There is also a new oak pulpit. There is not sufficient money at present to restore the chancel and tower, but some new hangings and frontal have been sent to the church. The work has been carried out under the direction of Mr. Temple Moore, of London, the contractor being Mr. Atkinson, of Roos.

#### SANITARY AND ENGINEERING NEWS.

**OPENING OF DEEPDALE BRIDGE, BARNARD CASTLE.**—This new bridge, erected after a futile attempt at spanning the Tees, in which a flood washed away all the scaffolding and temporary works, was opened for traffic on the 11th inst. The *Newcastle Daily Chronicle* describes it as consisting of three openings, spanned by continuous lattice girders, resting upon two abutments and two piers. The central span is 57 ft. from centre to centre of the piers, and each of the side spans are 35 ft. 6 in. from centre of pier to centre of abutment. The main girders are placed 10 ft. apart, centre to centre, and at the middle of their depth, carry a plank footway 10 ft. in width, while below the footway provision is made for carrying three lines of 25-in. water mains. Each pier consists of two cast-iron cylinders, 6 ft. in diameter, surmounted by columns 4 ft. in diameter, united by cast-iron stay-bracing of arches, forming a truss between them. Each column is united to the 6-ft. cylinder by a moulded cast-iron base, laid at the same level in all four columns, and surmounted by a moulded cast-iron cap. The several lengths of the columns, base, and 6-ft. cylinders are formed with internal flanges, and with machine-faced joints, and bolted together with 1-in. bolts and nuts. To 6-ft. cylinders are each fixed, both in length and in diameter, string, the lowest length being cast with a cutting edge, while the height of the lengths and total height of the cylinders were determined by the level at which a good rock bottom was eventually found. The abutments, turrets, valve-wells, wing-walls, and terminal newells are in coursed rock-faced masonry. The plinths, girder-beds, pipe-rests, coping, string courses, and corbels are executed in ashlar masonry. The stone came from the Stainton, Shaw Bank, and Dunhouse quarries, while the lattice rolled-work was supplied by Messrs. Head, Wrightson, & Co.

Mr. Mansergh, of Westminster, was the engineer and architect, and Messrs. Walter Scott & Co. the general contractors for the work.

**COMPLETION OF THE SEWERAGE OF WHITCHURCH.**—This scheme, which has been carried out by the Cardiff Rural Sanitary Authority, is one of the many important improvements recently executed by that body with the view to the improvement of public health. The sewerage of the parish of Whitchurch extends over an area of about 2,000 acres, and about eight miles in length, is based on the separate system, and consists of stoneware socket pipes ranging in size from 6 in. to 15 in. in diameter, and emptying into the trunk sewer of the Ystradgynaf and Pontypridd Joint Committee, which extends from the Rhondda to the Bristol Channel. The cost of the constructive part of the work was 4,360l. 3s. 11d. (368l. 15s. 8d. below the contract amount). Automatic flushing tanks are constructed at the principal dead ends, supplied by water from the Corporation mains. The gradients are so regulated as to make the whole of the sewers self-cleansing, and the manholes and lamp-holes are so arranged at each change of gradient and direction, that any stoppages or obstructions can easily be found and removed. Gauges are fixed near each connection with the sewer to measure the quantity of sewage passing, and the Authority, and each section is disconnected by syphons fixed near the trunk sewer to prevent foul gas passing up the sewers of the Authority from the trunk sewer. The scheme was designed and carried out by Mr. W. Fraser, A.M.Inst.C.E., the Engineer and Surveyor of the Authority.

**PROPOSED SEWERAGE SCHEME AT PORTISHEAD.**—On the 19th inst. Mr. Arnold Taylor, Chief Inspector to the Local Government Board, attended at the Assembly Hall, Portishead, to conduct an enquiry, the Portishead Local Board having applied for the sanction to borrow 14,000l. for works of sewerage and sewage disposal. Mr. C. Clyde, clerk to the Board, said there was no proper system of drainage at Portishead at the present time. The Corporation of Bristol were the largest owners of land at Portishead, and they raised no objection to the proposed scheme. The assessable rateable value was 11,815l., the acreage of the district 976 acres, number of houses 550. Mr. Moss Flower, C.E., of Bristol, Engineer for the scheme, read a report, in which he went into detail into the existing sewerage arrangement, and said the drainage was as bad as it could be; he thought that if typhoid-fever, diphtheria, or any other infectious disease broke out, there would be a very great difficulty in stamping it out. The report of the Engineer was subsequently endorsed by the Medical Officer of Health of the district. The Engineer next described the character of the work proposed to be carried out. There would be about eight miles of pipe-sewers. The sewage from the low level would be lifted at two points automatically into the high-level gravitating-sewer, and the whole of the sewers on the low-level would be made perfect water-tight. The sewage of the high-level and low-level would be taken out to sea, and discharged all times on the top of ordinary high-water. The outfall would be constructed of 15-in. cast-iron pipes, supported on lines of elm piles, and taken to a point below lowest water of lowest neap-tide. It was calculated that this outfall would suffice for a very large increase of population, as all rain and storm-water would, as far as possible, be taken to water-courses, or into the existing system of drains, which were to be repaired, cleansed, and extended where necessary. There would be manholes at every change of line and gradient, flush tanks at the top end of all sewers, and disc valves on the outlets of nearly all the manholes. Some of the manhole-covers would be blank, and the remainder would be of such form as could be quickly opened and closed at will. A large number of ornamental ventilating columns and shafts on the sides of the houses would be erected throughout the system. The smallest gradient was a vertical short length of the main sewer, and here it was 1 in 250. Some of the ratepayers thought some of the existing sewers were good; that the sewerage might cause a nuisance from the sewage, and that the scheme was too expensive, and that some modified scheme might be adopted; that they were afraid the works could not be done for the money; that the payment of the rate would prove a hardship to the small ratepayers, &c. The Inspector remarked that if a bit here might be good and a bit there bad it was improbable that the good would be worked into the other system, and that they were going to adopt a general system of sewerage, and that it was too expensive a scheme, but that they have an efficient scheme for less money. The Inspector, after closing the inquiry, had a private interview with the members of the Board, and pointed out the desirability of the Board enforcing the proper reconstruction of defective house-drains, and a close supervision as to the quality of the work to be altered imperfectly. The Board, were formed, at once saw the necessity of giving effect to the Inspector's suggestions. Subsequently the Inspector, in company with the Engineer, inspected the district.



## FOREIGN AND COLONIAL.

**FRANCE.**—The Parliamentary Commission of the Budget has just decided to put down altogether the direction des Établissements Civils, as being a useless and expensive machinery. In consequence of this decision, which will probably be voted for by the Chambers, the different services of the division will be divided between the Ministers. The Palais National, and the "Garde Meuble," will be returned to the Minister of Fine Arts, the ocean buildings to the Minister of Works. In December, in the Georges Petit Gallery.—The jury of the Ecole des Beaux-Arts has just awarded the following prizes: grand medal of competition to M. Bernard; the Blouet prize to M. Recourat; prize to M. Huillard.—On the 8th November public exhibition of the competition arranged by the architect, M. Roux, will be held in the Salon des Beaux-Arts. It is for the erection of a statue of Marie Fourré, a heroine of the sixteenth century, who by her courageous conduct defended her native town, and eventually its falling into the hands of the Comte de Nassau, who besieged it. The three sculptors who have taken part in the second trial are MM. Darné, Rigoulet, and Fosse.—The old hotel in the avenue Champs Elysées, built under the Second Empire for the Marquis de Paira, has been converted into a restaurant; it was decorated by various eminent painters and sculptors.—The Arc de Triomphe is being restored. The cornice was a good deal shaken a few years ago by some fireworks set off on the platform at the top.—The new school of Commerce has just been inaugurated at Lyons. The statue of Fontenay the monument was inaugurated, that has been erected in honour of the reformed-Anglo-French Federation. The architect of this monument is M. Deperthes, and the sculptors M. Legoff and Chavallat.—The municipality of Lyons has decided that the monument to President Carnot shall be erected on the Place de la République. The subscriptions for it amount already to 200,000 francs.—A fine sword of sixteenth-century date, with a richly-chased pommel, and bearing the arms of Montmorency, has been found on the Seine, near Conflans.—The municipality of La Flèche is about to raise a monument to Melles, the composer, who was a native of the town.—A new promenade pier is to be built at Bayonne.—The rather sudden death is announced of the painter Jean d'Alheim, an artist Russian by birth but French by adoption, who was known for his very interesting studies on the coast of the Mediterranean, while his qualities as a colourist were equally seen in his Parisian landscapes taken at Montreuil, Montmartre, and on the banks of the Seine. He had brought from Moscow recently a curious sketch which he had intended to turn to account in his paintings for the Salon.

**GERMANY.**—It is now definitely stated that the new Imperial Houses of Parliament will be ready for the opening of the Session in the middle of next month.—Telephonic communication is to be established between Berlin and Western Pomerania, Stettin and Stolp.—Work is shortly to be commenced on an extension of the tramway system of the city of Wiesbaden. The cost of the alterations at the Berlin Opera House, which are to be commenced next year, will be set down as 1,000,000, in the forthcoming Prussian Budget.—The Royal Academy of Arts announces the conditions of the competitions for six annual travelling scholarships, of a total value of 940l. Amongst these is one of 165l. reserved to architects.—The Imperial Government has been duly notified as a member of the Berlin University.—At a meeting of the Provincial Diet at Düsseldorf, it was decided to cooperate with the Rhenish and Westphalian provinces in petitioning the Minister of Public Works to reintroduce the Bill for extending the Emschervortmund canal to the Rhine.—A monument to the Emperor William I. has been unveiled by the Emperor and Duke of Baden at Mannheim. The type is an equestrian statue, from designs by Professor Eberlein, of Berlin.—A new chapel, to accommodate 450 persons, has been consecrated at Potsdam, in the presence of the Empress, who had contributed 1,500l. towards the building fund.

**RUSSIA.**—An important archaeological find is announced from Kerch, Crimea, where a well-preserved marble figure of a lion has been discovered in the ruins of the Pantikapaion. The work, which is of high, and undoubtedly of Classical origin, represents the animal with its paw resting on the head of an ox he has slain, and from certain points presumed to date from 200 to 300 B.C. It will be placed in the "Hermitage" at St. Petersburg.

**SWITZERLAND.**—The Simplon Tunnel project is again attracting general attention, as, although the Italian Government, whilst agreeing with the plans, has practically refused any financial support, the province of Turin is gradually being won over to the merits of the scheme. As several of the neighbouring Italian provinces have already promised to contribute a definite part for the raising of the necessary capital may shortly be expected.

**NORWAY.**—A syndicate has been formed in Christiania for the acquisition of a valuable site in the centre of the business part of the city, 2,650 metres

square, on which is to be erected a group of large commercial buildings.—It has been decided to erect a new lunatic asylum for north-central Norway in the town of Bodø, on the north-west coast, the architect being Herr Solberg.—It has also been decided by the Crown to build a new Asylum for Seafaring Men in Bergen, at a cost of 212,000 kr., for which plans and designs have been prepared by Herr Schach Bull, architect.—On the new railway from Lillehammer to Flisen, Herr Due, architect and President of the Norwegian Association of Architects and Engineers, has just completed a terminus station, at a cost of 70,000 kr.; whilst at Strømmen a large new club-house has been finished for the local Workmen's Association.—A company has been formed in the town of Porsgrund for the construction of electricity works for lighting and industrial purposes.—At the Helgeraa, in the Christiania Fjord, new harbour works are being constructed at a cost of 50,000 kr.—The great marble deposits in the province of Nordland are now being quarried with a view chiefly of introducing the stone as building material in the Scottish and English market. The stone, in all colours, may be delivered in British port for 90 kr. (5s.) per cubic metre. It is now being largely used by Norwegian architects.—One of the most important excavations ever effected in Norway are those of the castle of Stenwickhus, on an island in the Thronbjørn's fjord, which have now been in progress for two years. The ruins, &c., laid bare are the most extensive and interesting in the country. Although the ruins have for centuries served as a kind of quarry for the forts of Thronbjørn and the peasantry, the result of the excavations has exceeded expectations. The whole of the interior, with chambers, vaults, and towers (two), has been laid bare, whilst many interesting antiquities have been discovered. Many architectural ornaments have also been found, and a museum has been arranged in one of the excavated chambers. The castle, which dates from the twelfth century, was built by a Norse archbishop.

## MISCELLANEOUS.

**NEW HARBOUR WORKS IN DENMARK.**—Engineering works of considerable magnitude are in course of construction in the Limfjord, in Jutland, the cost being estimated at 415,000 kr. Concrete blocks weighing from 12,000 lbs. to 16,000 lbs., are used in the construction. The works include the building of a pier and railway into the fjord, 5,000 ft. in length.

**THE LIVERPOOL MASTER BUILDERS' ASSOCIATION.**—This Association held their annual meeting on the 4th inst. at their offices, 6, Lord-street, Liverpool, Mr. J. Sirett Brown presiding. The report and accounts for the past twelve months were read and adopted, and the officers for the ensuing year were appointed, with Mr. William Hall as President. The report states that the notices received from the various branches of the building trades for advances in wages, reduction in working hours, and alterations in trade rules have all been amicably settled, and that all the trades (with the exception of the masons) are now working to a uniform code of rules. Last autumn notices were received for a reduction of the working hours and an advance of wages from the bricklayers, plasterers, slaters, plumbers, and painters, and also from the bricklayers' and plasterers' labourers, and the committee considered this a good opportunity for endeavouring to effect such alterations in the general rules as would then be applicable to all the various branches of the trade. The masons and carpenters and joiners were working virtually the hours the other trades desired—viz., what is popularly called the nine hours' system; but to effect a uniform code of rules it was necessary to serve them with a notice of the proposed new rules, which was done. These rules were drafted by the committee, and submitted to a special meeting of the Association and approved of. The Association has considerably increased the number of its members during the past year.

**SANITARY INSTITUTE.**—The Council of this Institute have arranged for a second course of free public lectures on the "Sanitation of Industries and Occupations," to be delivered at the Parkes Museum. The subjects include "Quarantine of Various Kinds" by Mr. Le Neve Foster (Thursday, Nov. 8), and "Workers in Copper, Zinc, Brass and Tin," by Mr. R. M. Simon (Thursday, Nov. 20).

**MODEL LODGING-HOUSES, SALFORD.**—Messrs. Faulkner & Sons, in regard to the notice of these buildings in our last issue, wish to point out that the divisions of the cubicles are constructed with their patent steel sheets with a double rib or corrugation on each edge of the sheets, which gives them sufficient strength to dispense with any framework when they reach from floor to ceiling. The same sheets have been used by the London County Council in their Parker-street lodging-house.

**THE STOCKHOLM INDUSTRIAL EXHIBITION.**—The working committee of the Industrial Exhibition to be held in Stockholm in 1897 has now presented its report. The committee proposes that it shall be held on the so-called Lejon Plain, where a site having an area of 142,000 square metres is to be

acquired. The cost of construction on this spot is estimated at 2,342,725 kr., and the working expenses at 600,000 kr. The total receipts are reckoned at 1,480,000 kr., so that a sum of 1,462,725 kr. will have to be obtained in another manner. Two other sites are, however, under consideration, where the cost would be much less, but they are not so centrally situated.

**WATER SUPPLY IN THE DISTRICT OF HOLWELL.**—At a meeting of the Holwell Rural Sanitary Authority on October 19 a special report on the condition of the water supplies in the western portion of the district was presented by Dr. Williams, the Medical Officer of Health. According to this report, many of the larger hamlets were almost without pure and reliable water supplies. Several places near Gwispwy, Newmarket, and Sarn were in a serious state, and required looking to at once. The Sanitary Inspector was instructed to inquire and report as to what measures should be adopted to provide sufficient water supplies for the various localities.

**THE SANITARY INSPECTORS' ASSOCIATION.**—In connexion with the course of lectures and demonstrations arranged by the Sanitary Inspectors' Association for sanitary officers, Professor Vivian B. Lewes, F.C.S., F.I.C., delivered the second of a series of five lectures on "Combustion and the Influence of its Products on Health," at St. James's Hall, Piccadilly, on Monday evening. Mr. H. Thomas, of Bernersday, presided. Professor Lewes now dealt with the prime factor in combustion, viz., the atmosphere, premising that they had a good deal to learn and realise before they were in a position to tackle the products of combustion and the influences they had upon air and upon health. Having said that the atmosphere did not begin to have a scientific history until the seventeenth century he referred to the experiments upon air which were made in 1643 by Torricelli, and which led to the discovery of the first great physical fact ever found out about it, which was that the atmosphere had weight. Illustrations of atmospheric pressure followed, and having alluded to Robert Boyle's subsequent discovery of the compressibility of gases, the lecturer said that when the composite nature of the atmosphere was first discovered, it was supposed by Cavendish and others to be a chemical compound of nitrogen and oxygen. John Dalton, the founder of our present atomic theory of chemistry, however, had since found it to be a mechanical mixture of the gases contained in it. The laws by which that mixture was kept so constant as it was were among the most marvellous that could be found in nature, and those laws they would come across during these lectures. Professor Lewes's next point was that the atmosphere contained many other things besides oxygen and nitrogen, and these other gases, he said, it had always been the fashion till lately to talk of as impurities, but no greater mistake was ever made; such gases were only impurities when they rose above a certain limit. There were three minor constituents of the atmosphere—carbon dioxide, water vapour, and minute traces of ammonia. These were all required by nature for natural work, and impurities proper only existed where the cause for them existed; for instance, where there were open drains the presence of sewer-gas in the air would be noticed, while in the Midland Counties, in Lambeth, and wherever salt glazing was carried on, they would find traces of hydrochloric acid. The way in which carbon dioxide was produced in nature was nearly always by combustion, the oxygen taken from the air by combustion being replaced by carbon dioxide; it was produced wherever there was carbon, or where there was respiration and a process of decay. In some parts of the world carbon dioxide issued from the ground to an enormous extent. The lecturer explained that the water-vapour in the atmosphere allowed life to go on, and that its presence depended upon the temperature; and, finally, he pointed out how ammonia gas was needed by plant-life, and how, particularly, by a heavy fall of rain, it was dissolved and brought down to the vegetation that required it. Professor Lewes's third lecture will be delivered next Monday evening.

**BOROUGH ENGINEER APPOINTMENT, READING.**—Mr. J. Bowen, A.M.Inst.C.E., Borough Surveyor, of High Wycombe, Bucks, has been recommended by a committee of the Reading Town Council for the appointment of Borough Engineer. The other candidates selected and interviewed by the Council (out of a total number of 111 applicants) were Mr. Thomas Reader Smith, A.M.Inst.C.E., of Kettering; Mr. Campbell, A.M.Inst.C.E., of Stratford-on-Avon; Mr. Wits, of Leeds; Mr. F. W. Howard, of Reading, and Mr. W. Jane, of Reading. Mr. Jane acted as Borough Engineer during the period of about three months since the appointment of the late Borough Engineer, Mr. Collins, A.M.Inst.C.E., to the City Engineering of Norwich.

**CITY AND GUILDS INSTITUTE EXAMINATIONS IN PLUMBING, 1894.**—There has been no break in the steady and continuous increase in the number of candidates for examination in plumbers' work. The numbers for the past five years have been successively 569, 684, 825, 968, and this year rose to 1,253, the largest number yet reached. Of the 1,253 candidates examined this year 192 have passed in the Honours Grade and 460 in the Ordinary. In the examination



TUESDAY, OCTOBER 30.  
University Extension Society (Chelva Centre):  
Town Hall.—Mr. Arnold Mitchell on "English  
Architecture," IV. 3 p.m.







N. (            *SOLE IMPORTERS.*



# The Builder.

VOL. LXVII. No. 2720.

NOVEMBER 3, 1894.

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Design for a Village Church.—By Mr. F. C. Eden .....	Double-Page Ink-Photo.
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### Wooden Architecture of Norway.



HOUGH Norway has recently become a great resort for holiday-makers from this country, yet it may be doubted whether the country itself and its institutions are much better known to the English visitor than they were twenty years back; and this is more especially the case in regard to architecture, as the inhabitants on a beaten "tourist" track soon lose their individuality; their picturesque homes make way for the lodging-house and hotel; their monuments and places of worship are "modernised" with the stranger's money, and even their institutions are gradually changed or only artificially kept up to please foreign visitors. For those visitors to Norway who wish to leave the beaten track, and see something more of the indigenous architecture of the country districts, we may recommend an interesting volume lately published at Berlin,\* "Die Holzbaukunst Norwegens," of which Messrs. Dietrichson and Munthe are the joint authors. Dr. L. Dietrichson is one of the Professors at the Christiania University and the leading authority on Norwegian archaeology. Mr. H. Munthe is one of the architects to the Christiania Board of Works, whose private practice has lately been considerably increased by the frequent commissions of the German Emperor, whose new chalets, boathouses, &c., are apparently now all to exhibit the Norse style.

"Die Holzbaukunst Norwegens" contains some hundred and fifty pages of well-written text, illustrated with about two hundred carefully-executed woodcuts, as well as some good full-page photo-lithographs. The book is divided into two main parts, treating respectively of the ancient and the modern architecture of the country; the first part being again divided into a chapter on church work, and another on utilitarian erections. The section on modern architecture is practically only a series of illustrations representing work by the leading architects of

modern Norway, and its text is of minor importance. In the first part both text and illustrations merit equal attention.

Chapter I. of the first part has the heading "Stabkirchen," and is practically an abbreviated German translation of Dr. Dietrichson's "De Norske Stavkirker." This standard Norwegian work was essentially an archaeological chronicle of everything referring to the three hundred wooden churches the country could at one time boast of. In the German chapter the author, however, writes more popularly and with less detail, and gives precedence to the still existing monuments. Their number is, unfortunately, now but small, practically only some two dozen, and these are spread all over the country, especially in the inland province of Hamar; but for all that, though the usual tourist's track will often have to be left, even the most distant of them are tolerably accessible off the Christiania-Thronhjelm Railway. In 1884 some few were, strange to say, removed from their original positions, and are now to be found at more convenient places near Christiania, Bergen, and Thronhjelm. There the less enterprising tourist can go over well-preserved specimens at the price of sixpence each, and hear all particulars from a "guide" in return for the usual gratuity. Of course, the Christiania Museum and other Norwegian collections also contain a number of pieces from the buildings which have disappeared, and many of the churches which were re-erected in stone contain some memento of their predecessors; but these exhibits are but a poor substitute for the complete originals, where the picturesqueness of the general effect was the main attraction. However interesting the detail may be in a certain sense, and however much we may sometimes admire its excellent technique, the coarseness, not to say vulgarity, of the design is often so predominant when we examine an individual piece of the work closely that we are disappointed. To enjoy the effect of a Norwegian wooden church, the spectator should stand a hundred yards off. He should also not see the carefully-prepared specimen in the suburb of a town, but those which stand in their natural surroundings, in hilly country, far away from railways, and, if possible, with a group of the native population in their picturesque costumes close at hand.

Intending visitors should note the following list of wooden churches yet to be seen in their original positions. There are two at Grip and Kvernnes, both near the coast in the Nordmøre district of the Province of Thronhjelm; the Rödven church is up one of the fiords in the Romsdal district of this province. In the Sogne district of the Province of Bergen there are churches at Urnes, Borgund, Hopperstad, and Kaupanger. All four are situated far up the Sogne Fiord, quite a hundred miles from the sea. The Roldal Church, up the Hardanger Fiord, is in a district of the same name in the Province of Bergen. The churches at Hitterdal and Eidsborg in the Thalemark district are the only two remaining in the Province of Christiansand. They are situated due west of Christiania, half way between the capital and the west coast. The Province of Christiania has some specimens at Nore, Opdal, and Torpe. The first two are in the Numedal district, the latter in Hallingdal. All the five buildings last mentioned are well inland, and hence less easily accessible than the others. The Province of Hamar has seven churches. Five of these are in the Valdres district, at Hedal, Reinli, Hegge, Lomen, and Hurum; two in the Gudbrandsdal district, at Lom and Ringebu. These are the most difficult to get at, as they require much driving and walking to reach them. The most important buildings on this list are those at Hitterdal, Borgund, Urnes, Hopperstad, Lom, and Ringebu. As their situation is also very beautiful, the student will certainly do well to visit them.

Of the buildings so conveniently transferred from their original sites, the two at Christiania and Thronhjelm alone deserve attention. They were brought respectively from Guldal and Gol.

It is not our intention to enter on the historical development of the Norse churches which Dr. Dietrichson so ably describes. It will suffice to give a few particulars of the chief monuments. The Hitterdal Church has a history reaching back to 1315 A.D. The building has been much altered in the course of time, and after practically becoming a ruin, had to be thoroughly restored in 1849. This "restoration" having been done without a thorough knowledge of its style, its former individuality has been practically lost. The chief dimensions of the nave are 35½ ft. by 32½ ft.; the choir measures 20 ft.

\* "Die Holzbaukunst Norwegens in Vergangenheit und Gegenwart." By Dr. L. Dietrichson and H. Munthe. Berlin: Schuster & Buchle, 1894.

square; the main ridge of the church is 53 ft. above the ground; the cross in the turret is 83 ft. high. There are some excellent specimens of wood-carving on the doors.

Borgund Church, of which we give a plan (see Fig. 1), is perhaps one of the

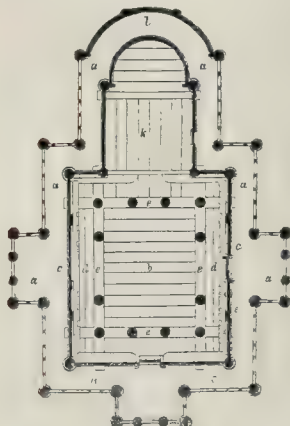


Fig. 1.—Plan of Borgund Church.

best known, owing to its situation on the Christiania-Bergen high road. It is certainly one of the best-preserved buildings of its kind, and has not been spoilt by any injudicious restoration. It is believed to have been erected about the middle of the twelfth century, as far back as 1150, though there is no positive proof of its existence earlier than 1360. There is little doubt that some of its porches and turrets were added at a later date, but otherwise the original plan is practically undisturbed. The main dimensions of the plan are 42 ft. by 32 ft. for the nave, and 30 ft. by 24 ft. for the choir. The roof-ridge is 50 ft. above the ground.



Fig. 5.—Front Elevation of Gol Church.

The church at Urnes, according to Dr. Dietrichson, is supposed to have been built at the end of the eleventh century. Our plan (see Fig. 2), shows the building as it now stands, but there is little doubt that the church formerly covered more ground. It has an amount of curious barbaric carving, the design of which can in no way be compared with the refined specimens at the Hittertal Church, but its quaint emblems have furnished much matter for study to the ethnologist, and are hence of some permanent scientific value. The nave measures 28 ft. by 21½ ft. The pieces of carving

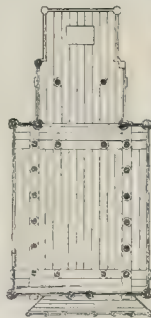


Fig. 2.

Plan of Urnes Church.



Fig. 3.—A Capital from Gol Church.

we illustrate (see Figs. 3 and 4), one from the Gol Church, the other from Hemsedal, are examples of two classes of ornamental design to be found in a Norse church.

The Gol church, of which we also give an elevation and plan (see Figs. 5 and 6),

stands, as before observed, at Thronhjem; King Oscar II. had it removed in



Fig. 4.—A Door at Hemsedal Church.

1884 and of course a "restoration" was necessary. Thanks, however, to the experience gained in patching up other buildings, the individuality of this building has fortunately not been lost, and it affords us an excellent example of its style with a most varied collection of woodcarving from different periods. Some fresco work by the Norwegian peasant-painter Kineberg

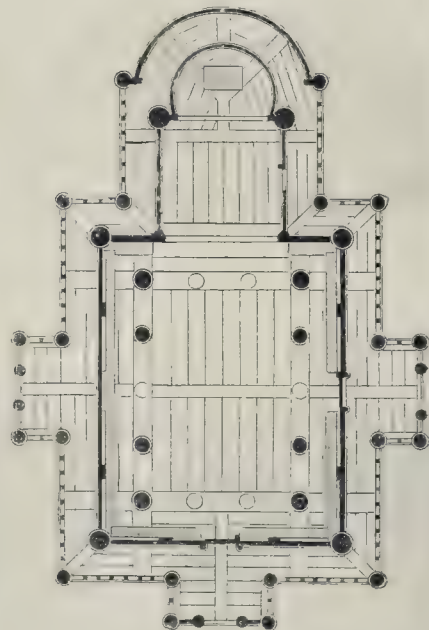


Fig. 6.—Plan of Gol Church.



from 1652. The "Lords Supper," the "Apostles," &c., are among the subjects treated by this rustic artist, and a comparison with the contemporary work of other countries is by no means uninteresting. The dimensions of the Gol church are 25 ft. by 21 ft. for the nave, 10½ ft. by 10½ ft. for the choir, 38 ft. to the main ridge, and 62 ft. to the top of the tower.

Dr. Dietrichson's second chapter, as before marked, treats of utilitarian buildings only. The old examples of huts, farmyards, village fences, and the like, are explained. We reproduce illustrations of some types of rural block-houses, which are quite as substantial as they are picturesque (see Figs. 7, 8, and 9). We regret not to find any re-

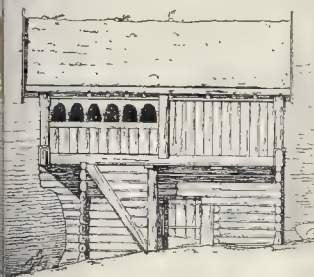


Fig. 7.—A Hut at Rolstad.

construction of the old Norwegian "chieftains' palaces in this chapter, as it would have been interesting to see how wooden buildings were adapted for more important and elaborate requirements.

What can be done with Norse work, even in fulfilment of modern requirements, can be seen in the second part of the book, which treats of the Norwegian national architecture of to-day. Practically every class of building is represented, and in nearly every case

we find this "renaissance" productive of very pleasing results. One of the first examples of this period was a villa at Christiania, designed by Mr. Schirmer, in 1851. A boat-house, built in 1867, from drawings of Mr. G. Bull, was the next. Other examples are shown, such as the railway station at Sandviken (1873), also by Mr. Bull, and a hotel from Mr. Thrup-Meyer's design. Previous to 1885 the revivals of the ancient style were somewhat amateurish, but since that period the revival architects have thoroughly got up the ancient style, and the work has been well done. Mr. H. Munthe, the joint author of the present book, soon became known as a specialist, and his works not only find favour at home, but also abroad. The Holmskollen Hotel, a two-story building, is a good example of the work this architect has done in his own country. This building has a frontage of about 100 ft. Its dining-room is 45 ft. long, the drawing-room 35 ft. square, and yet the details of the Norse style, generally associated with small rural buildings, do not look out of place. It lends itself excellently, of course, to country hotels and chalets; and, backed by green foliage, even looks better than our own half-timber work. Frognersaeteren, near Christiania, also illustrated in the book, though a small building, is an excellent piece of work of its kind. Of buildings Mr. Munthe has carried out in other countries, those for the German Emperor are the best known and most important. Mr. Munthe built the Emperor's boathouse at Potsdam, his new chalet at Rominten, and a church at the same place. All these are illustrated in the volume, and are, perhaps, the most interesting things among the plates showing modern work.

The Potsdam boat-house represents modern Norse architecture of the simplest kind, but the grouping of the block is picturesque, and the appearance of the building is very suitable to its purpose. The new chalet at Rominten has more elaboration;

the elevation we reproduce (see Fig. 10) unfortunately does not do the building justice, as its effectiveness is to a great extent dependent on the grouping. The main outline of the block-plan is in H-shape. The centre part is lower than the wings, and contains the Emperor's reception-room; the right wing contains the Emperor's apartments, the left has those of his suite. The details, both inside and out, are good—the carving especially so. The Emperor's apartments on the ground floor consist of an ante-room, 20 ft. by 14 ft.; a sitting-room, 20 ft. square; with a loggia and a verandah. Off the sitting-room is the aforesaid central reception-room, which measures 40 ft. by 22 ft., and is also used as a dining-room. On the first floor is a large study, bed-room and bath-room, with a verandah. These rooms have their own staircase, and are reached by passing through an ante-room, off which there are also offices for an adjutant and a valet. The wing in which the suite has its apartments contains four rooms on the ground-floor and four on the first. There is a separate staircase, and the necessary bath-rooms and offices have been provided in duplicate. The kitchen and servants' quarters are in a roomy basement.

The church at Rominten, of which we give the plan (see Fig. 11), is an excellent

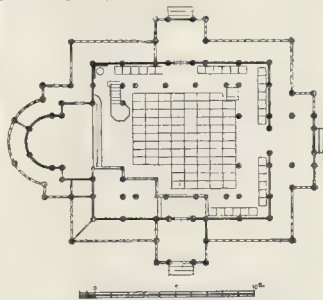


Fig. 11.—Plan of the new Rominten Church.

example of the "Norse Renaissance." The individuality of the old work is not lost, but both in plan and detail there is a marked improvement on what can be seen in Norway. The church is practically used as the Court chapel to the chalet described above, and the Emperor has hence been provided with a pew near the altar and a separate porch. This place of worship is, of course, quite a miniature one, but certainly a far more pleasing building than some of the more commonplace types of brick and stone churches frequently built in rural districts; still more is it superior to that terrible class of erection, the "temporary" iron church.\*

A NOTE IN GERMANY.

GOOD deal is heard from time to time of the spread of German influence in Africa, and of the development of a German colonial policy. At other times it is the introduction of German manufactures into various markets which have hitherto been largely a monopoly of English manufacturers to which attention is drawn, and sometimes even it is the competition of German with English goods in our own country. These, however, are only some of the ways in which the increasing and abounding energy of the German nation obtains vent for its force: it is visible within Germany itself in all sorts of ways. No one, indeed, can doubt that the creation of a comparatively homogeneous German empire nearly twenty-five years ago has done much to produce not merely a national military feeling, but also a national energy working for various ends. And there cannot, we think, be the smallest doubt that Germany will become a much more serious mercantile

\* The illustrations to this article are reproduced, by permission from Messrs. Dietrichson & Munthe's book.



Fig. 8.—A Hut at Nylus.

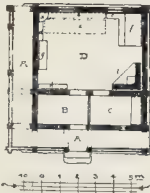


Fig. 9.—Plan to Fig. 8.



Fig. 10.—The German Emperor's new Chalet at Rominten.



rival of Great Britain in the future, and that if workmen and capitalists in this country fail to work together harmoniously, or are unable to perceive the importance of the trend of affairs, they are likely to come off second best in the markets of the world.

The energy and public spirit which have received so marked a stimulus in Germany is very apparent in the erection of fine public buildings and works of a similar kind. Among these—and we enumerate one or two to exemplify our statement—one of the most noticeable is the great central station of Frankfurt, which was completed in 1889, remarkable not less for its admirable arrangements and simplicity than for its enormous size. It is significant of a principle which has recently been worked out in practice in Germany, and which is sure to receive fresh additions—namely, that of concentrating the various lines which touch in a great town in one central station. Unquestionably such a concentration is hardly possible in this country, however desirable it may be. In Germany there is practically a system of State railways, and thus there is but one governing body. It is obviously absurd that in London the three great northern lines should have their separate termini within a mile of each other; but it is an anomaly which we must expect in a country which has not a State railway system, and it is possible that it may be counterbalanced by some advantages. The same principle has been carried out at Cologne, where there is now a central station, not only convenient and roomy in its internal arrangements, but showing externally a desire to make the building worthy of an important town. This desire is one of the noticeable features of the day in Germany, and it must to some extent, we think, be attributed to the sense of national pride which has been aroused by the unification of the empire. Frankfurt is, after Berlin, perhaps the most striking example of this. We need not refer to the Opera House, which was completed and opened in 1880, a work well known to our architectural readers. But there are other important public buildings, such as the Bourse; at this very moment a new Post Office is in course of erection and almost completed in the Zeil, which will be an important addition, and a very necessary one, to the great buildings of this city. It is appropriately surmounted by a winged Mercury, whose freedom of movement, however, appears to be hampered by some unnecessary drapery, typical, perhaps, of the red tape which appears to be inseparable from all Government departments. This determination to erect buildings worthy of a great empire is not, however, confined to populous cities like Frankfurt—it may be seen in a comparatively small town such as Wiesbaden, where a large new theatre is nearly completed. This is in a Classical style, with pediment and columns, and sculpture. Its position in an open space, with gardens and trees around, gives it an importance which would, to some extent, be lost were it closed around by other buildings.\* But one may go yet lower down the scale, and take the post-offices which have been of late years built in small towns and villages. These are always roomy and well-finished inside, and have ample accommodation for the public and for the employees, and with some attempt, more or less successful, at architectural effect externally. And in regard to these German post-offices we may well call attention to the noticeable difference which is at once evident between them and English offices. In Germany facilities are given for correspondence to the public inside the office. New offices are nearly always built with a commodious hall, in which is placed a table furnished with paper and blotting-pads, and chairs. Thus a person can buy his postcard, write on it what he wishes, and dispatch it as conveniently as in or from his office. When we compare this with the

complete absence of writing accommodation which there is in most English post-offices, and the beggarly accommodation which is given in others, we may well ask for an energetic Bureau, and not a department like our Post Office—a mere division of the Treasury.

This, however, is a digression. Our intention in alluding to the new German post-offices was to cite them as evidence of the widespread national attempt in Germany to make the towns worthy of the first European empire. Of Berlin we have said nothing, for in the capital it is natural to find many new and important buildings; it is in the cities and towns at a distance from the seat of government that we must look for the true evidence of the general national feeling. Germany has conquered in war, and she is determined to be great in the arts of peace. Public attention is so much drawn to the extraordinary efforts made to keep her army at the highest pitch of efficiency, and to fulfil the object of the highest military authorities that she shall be "a nation in arms," that we are apt to overlook the way in which she is pursuing objects better in the estimation of many than the creation of big battalions and deadly artillery. Yet the very increase in her towns, and the number of important buildings, and, in a word, the growth of material and commercial prosperity are actually causes which tend toward greater armaments in Germany, since the preservation of even the least important building in a country town depends in a sense on the armies by which the empire is defended. Everywhere, indeed, is now visible in Germany the signs of an energetic and growing nation, youthful in the way in which things are swept and garnished, and vigorous in the determination to create and to defend; to be not only the first of military, but also of commercial nations; to have not only the largest and most efficient army in the world, but great material prosperity within its territories.

#### NOTES.

**T**HAS now been finally decided that the new Imperial Houses of Parliament at Berlin will be opened about the middle of this month, and the members of the Reichstag have already been informed that the first meeting of the new Session will be on the 25th inst. Nothing has as yet been definitely decided as to the opening ceremony, and it hence appears that there will be no unusual display. This, we understand, is due to the Emperor's prejudice against Herr Wallot's building. It is interesting, however, to see what is the opinion of Herr Wallot's work outside the Imperial *entourage*, which is believed to simply echo the criticisms of the unpopular Court favourites, Professor Begas and Herr Ihne. The Dresden Royal Academy gives Herr Wallot the most coveted German professorship at its schools, which was formerly held by Gottfried Semper. The German and foreign architectural societies vie with one another in bestowing distinctions, and the educated laymen, as represented by the University, confer honorary degrees on the architect. Whatever the merits of the work may be, those who judge it should remember that the architect, in the first place, was under the rule of a committee that never knew its own mind, and was constantly changing its requirements. We published some illustrations in our New Year's number, taken from the models of the design, which gave an idea of the general architectural treatment of the building, as well as the detail elevation of a portion of the façade. We may be able shortly to give some further illustrations.

**S**EVERAL letters have appeared in the *Times* during the past fortnight with reference to a suggestion made by the Rev. H. R. Haweis that certain portions of the exterior of St. Paul's Cathedral should be

washed down "with soda and water or pure water" in order to rid the stone of its coating of soot. From the general tenor of Mr. Haweis's remarks, one might suppose that his proposition is a novel one, whereas the idea has been mooted times out of number. Indeed, unless our memory is at fault, portions of the building were treated in this manner some years since. Be that as it may, it is well known by everyone who takes an interest in London building stones that the practice of periodically cleansing the surface of them with water was commonly in vogue from thirty to forty years since. Had Mr. Haweis been aware of this, and had he taken pains to ascertain the reasons why this "cleansing" process has been more or less abandoned, he might possibly have spared himself the trouble of raising the unnecessary discussion in the columns of our contemporary to which we have adverted. Westminster Abbey, too, with certain statues along the line of route from St. Paul's are recommended to the tender mercies of the Fire Brigade. The fact is that oolitic building stones and all others that are fairly absorbent require something more than mere washing to render them white again after being subjected to the soot and dirt of London. The filth gets engrained in the outermost coats of the stone, and anyone who has paid much attention to the subject knows that the foreign particles are often encased in the hard skin chemically formed on the exterior. The precise nature and origin of this skin have never been properly investigated, though some attempts have been made in that direction. But we know that in regard to the majority of limestones it is formed at the expense of the substance of the stone. On exposure to the atmosphere the initial quarry water is drawn by capillarity to the surface of the block and evaporates. It then leaves behind a sort of deposit composed of mineral matter obtained from the interior of the stone. It has been held by most competent authorities that if the hard skin thus made is removed it will never again form. That it protects the fabric of the material beyond question. The only way to remove it would be by scraping it off; water from hose would be powerless to do so. It may well be doubted if the periodical washing of some stones affects their durability to the slightest degree, but we cannot include the stone of St. Paul's in that category. Supposing the edifice were scraped down, the process would have to be continually renewed to keep the surface clean, and in time much harm would result from that alone. Soot is present part and parcel of the London atmosphere, and to quote the words of a writer in reference to this matter, you "cannot divorce a building from its surroundings." From an artistic point of view it is very questionable whether the appearance of the building would not be considerably marred by cleansing and scraping. The stone would present a "pale work" appearance when finished, and experiences in reference to the Mansie House, when that was cleaned down some time ago, are not encouraging—it presents a pitiable sight for a few years until it has toned down again.

**T**HE National Free Labour Congress, which has been held in London this week, and a short report of which appeared on another page, was very well represented by provincial delegates, and was interesting both on account of the unanimity of opinion of the Congress and the statements contained in the report relating to the growth of the Association. The picketing system practised during strikes received much merited condemnation, and the opinion of the Marquis of Salisbury in this connexion is of interest, for the interpretation of present law cannot be in accordance with views of the framers of the Bill. The most instructive and gratifying fact mentioned in the report, however, was that the number of workmen registered by the Association

\* Some further information about this theatre will be found on page 307.



During the last twelve months amounted to 1,540, and that its total membership is now over 51,000. These figures were given in the annual report, and, if they are correct, and we have no reason for doubting them, they indicate the growth of an intelligent opinion on the part of working men, and suggest that the days of tyranny of the new trades unions are numbered. The genuine expressions of opinion (for such they undoubtedly were) of some of the delegates as to the extent of its tyranny were sufficient to convince any impartial hearer of the immorality and narrow-mindedness of those responsible for the tactics of the unions, and we believe that the disastrous effects of these tactics could be properly represented to the average working man, he would consider that the questionable advantages which are to be gained by combination are of less moment than the cruelty and wrong which they entail.

As regards the closing of the Empire Theatre, we may point out the fallacy of requiring a building expressly built to suit certain requirements to be cut out and adopted for entirely different purposes. Mr. Verity's theatre is, from an architect's point of view, in no way suited for the alterations desired by the County Council. The lines on which the auditorium was set out were governed by the owners' requirement to have ample promenade room, and not to obtain a maximum number of seats. Here, as in all other countries, the income of this class of theatre is not intended to be governed by the actual seating accommodation, and nothing but the entire reconstruction of the auditorium would make it possible for the expense of an ordinary performance to be covered. Part of the essence of a "Variety" entertainment is a certain freedom of restraint as to seating; promenade-room being a recognised necessity. In Austria the whole floor of the auditorium is practically a promenade; the seating accommodation being in the restaurant fashion, at small tables. The open-air variety stages at Copenhagen and Stockholm do not adopt the same kind of unfettered arrangement, only a few fixed seats being provided. It is impossible for a house built for promenading to be equally suitable for full seating accommodation.

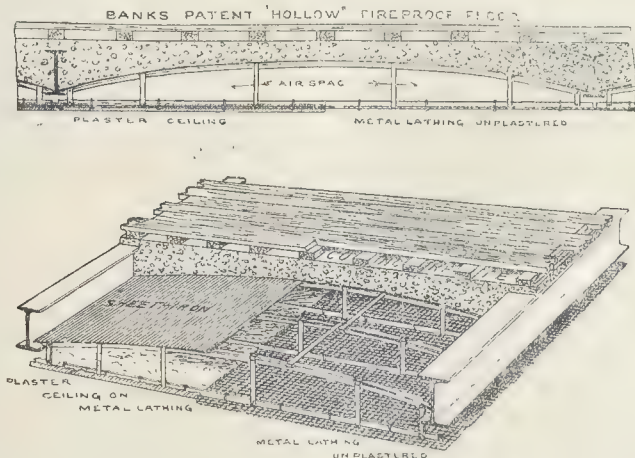
DR. FURTWÄGLER contributes to the current number of the *Berliner Philologische Wochenschrift* a paper on the significance—for the history of ancient art—of the discoveries at Delphi. His remarks on the Sphinx of Naxos will interest architects. The Sphinx is supported, it will be remembered, on a base consisting of a huge column, surmounted by an Ionic capital. This capital is of the first importance in the history of the development of the Ionic order. The volute and the cyma are still distinct and independent, not passing over the one into the other, and this supports the theory long ago put forward by Puchstein ("Das Ionische Capitell," 1887), as to the development of the Ionic capital. All the important portions of both Sphinx and base have been discovered, so that it can easily be put together. This is being done, and it is proposed to take a cast of it, which is to be set up in the Louvre. The Sphinx itself is of unmistakably Samian style, and, as is usual in sculptures of that school, is of marble from Naxos. Dr. Furtwängler opposes the theory started by Dr. Sauer, that this Samian style took its rise in Naxos; both the architecture and sculpture point to Samos. Of even greater architectural importance is the "Treasury of the Athenians," for two reasons—it is admirably well-preserved, and, as we have before noted, securely dated. With the exception of the lowest step, which, as in the case of the Athenian stoa, is of rough calcareous stone, the whole structure is of Parian marble, the metopes of the finest marble, the triglyphs of a somewhat inferior quality and of a bluish

colour. The architectural details are carried out with a fineness and finish that is, according to Dr. Furtwängler, so far unique. The precision with which both its inscription and literary tradition date it will upset more than one recent hypothesis, especially that which would date back the Æginetan sculptures to the sixth century B.C. The Athenian Treasury shows clearly that they must belong to the time of the Persian wars; presumably the temple of Ægina was built after the first attack on Athens, i.e. circa 480-487 B.C. Further, the metope sculptures at Delphi have an important bearing on the archaic "Acropolis" statues. Those of the "Chios" type have their clearest analogy in the Delphian metope heads, and must, therefore, presumably have been executed, not as was formerly supposed, in the time of the Peisistratidae, but in the period between their banishment and 480 B.C. By a similar course of reasoning we can no longer, with Dr. Kalkmann, place the Olympian sculptures as early as the beginning of the fifth century B.C.

THE Art Gallery Committee of Manchester has arranged to hold an Arts and Crafts Exhibition, in the rooms of the City Art Gallery, in April next. The main objects are to bring together a number of fine examples of industrial art, with a view to educate the public taste, and to identify the actual designers and skilled workers, in respect of the exhibits that may be sent in, with the works exhibited. The Committee invite

hidden orchestra, whilst the small string band for a Strauss operetta should be in view. The cost of the building is close on 100,000*l.* The estimates in 1892, when Messrs. Fellner & Helmer's design was accepted, figured at 79,500*l.* The only complaint we have so far heard of is the "sighting" from the stalls, where the rows of seats do not rise sufficiently behind one another.

AN interesting Exhibition of Fireproof Construction and Fire Tests was given by Banks' Fireproof Construction Syndicate at the St. Pancras Ironworks, Belle Isle, N.W., on the 26th ult. In the case of the new fireproof floor brought out by the syndicate, a severe test was applied as to its fire-resisting qualities. The invention consists of a suspended ceiling of steel lathing which acts as the fire-checking material, being coated with plaster. Between this ceiling and the floor above is an air chamber through which, by the use of air bricks in the exterior walls, a current of air is allowed to pass. The great advantage claimed for the invention is that the constructive iron or woodwork is not in contact with any substance reached by the flames, a moving body of air acting as a non-conductor. Above the suspended ceiling are concrete arches 4 in. in thickness at the crown, resting upon sheet-iron, which in its turn is supported by T-irons bent to the curve (see illustration). The total thickness of the floor is 10 in. to



the co-operation of employers, trade guilds and societies, and of others interested in the promotion of artistic industries, with the object of ensuring an exhibition of high merit. Those wishing to exhibit can apply for a prospectus to the Curator of the City Art Gallery, Manchester.

THE New Court Theatre at Wiesbaden, which has lately been opened by the German Emperor, is one of the most successful of Messrs. Fellner & Helmer's many playhouses. The commission was the outcome of a limited competition against Herr M. Semper, of Hamburg, and Herr Frentzen, of Aix-la-Chapelle. The new building will seat 1,400 persons. There are three tiers, of which the first, or lower one, is divided up into boxes. The stage measures about 80 ft. by 65 ft., and is intended for operas and spectacular pieces as well as plays. Great attention has been paid to the stage machinery, which is worked by hydraulic power. Herr Brandt, the Chief Engineer at the Berlin Opera House, is responsible for this department. He has also introduced a movable orchestra floor, which can be raised and lowered according to the requirements of a piece. Wagner's operas, for instance, require a

12 in. In the cheaper forms, the T-irons and the sheeting are dispensed with, the concrete being laid on temporary centres. In regard to the actual test applied, a small four-roomed erection had been constructed, the floors of the upper story and the partition walls being built on the system above described; the ground floor was filled with shavings and pitch-pine, on which was thrown petroleum, the whole being then ignited. The fire burnt for three-quarters of an hour, after which it was extinguished. Unfortunately, the pyrometer burst at 1,500 deg. Fahr., so the ultimate temperature was not gauged. When the interior was sufficiently cool to allow of examination, it did not appear to be damaged, the ceiling, with the exception of a few slight cracks, being intact, and the shavings placed on the floor above had not been ignited. The syndicate claim for this floor that it is fire-proof, noise-proof, light, and cheap. As no figures have been issued as to the cost, it is impossible to compare it in this respect with other well-known constructions.

THE municipal control of the tramways in Glasgow has hitherto resulted in a loss. It is true that they have not long been under the control of the Corporation, but



even their present want of financial success should make Corporations very careful before they make such undertakings as these public property. No doubt a smaller profit is sufficient when tramways are under public control, since it is sufficient to pay the interest upon any capital which may have been raised in order to purchase the undertaking. But the public expect more from an undertaking which is, so to speak, their own property than when it belongs to a private company, and there will certainly be a tendency to give comfortable travelling at the expense of the general body of ratepayers. There is likewise a vital difference between taking under municipal control the lighting and supply of water, necessities for all classes, and the means of locomotion, which are not required by all, and only serve certain parts of a city.

IT is not at all surprising that the people of Sunderland should consider themselves badly treated by the North-Eastern Railway Company. The central station at that town is, for a place of the size and importance of Sunderland, one of the most inconvenient in the country; and the railway company appear to have persistently turned a deaf ear to the representations made to them from time to time as to the great need for improved accommodation. Many stations at large towns have been enlarged and improved of late years, but the stimulus of competition appears to be sometimes needed in addition to the growing requirements of the traffic. That Sunderland still has to be content with the old inadequate low-level station may be taken as an illustration of this. The North-Eastern Co., who are, at present, secure from opposition in that town, are apparently unwilling to incur any expense in this direction, and the inhabitants are driven to seek the intervention of the Board of Trade in the matter. A large meeting was held on Monday last under the presidency of the Mayor, at which this course was recommended and unanimously approved. The Corporation were also authorised to appeal to the Railway Commissioners, but it is rather doubtful if this body would have power to interfere.

WE read that Mr. Cobbold has bought Christ Church, at Ipswich, as a gift to the burgesses. This old house stands on the site of Trinity Priory, in St. Margaret's parish, whose history is somewhat obscure. Norman de Gastrobe, or Fitz-Eadnoth, is popularly believed to have established here some Black Canons of St. Augustine, circa 1177. The priory having been burnt, John of Oxford, Bishop of Norwich, rebuilt it in the following reign. King John endowed Christ Church with the lands and profits of St. Michael and St. Saviour, in Ipswich. The priory, valued at 88*l.* 6*s.* 9*d.* per annum, was suppressed in view of founding Wolsey's Colleges at Ipswich and Oxford, but its revenues were not so appropriated, and after the Cardinal's disgrace were bestowed, in 1544, upon Sir Thomas Pope, Knight, who pulled down the buildings and erected the existing house in their stead.\* Pope, it will be remembered, did the same thing with Bermondsey Abbey, building for himself a house there with the materials of the abbey. He also refounded Durham College, Oxford, as Trinity College, in 1554. Christ Church passed subsequently to Leicester, Viscount Hereford, and from his successor to Claude Fonnereau, in whose family it continued for a long while. At a meeting in Ipswich ten years ago of the Suffolk Institute of Archaeology, a member stated he had seen a stone, inserted in the wall of the entrance into the Chapter House of Oxford Cathedral, being the foundation-stone of the college Wolsey set up at Ipswich in place of the Black Friars monastery of SS. Peter and Paul, founded

by Thomas Lacey and Alice, his wife, temp. Henry II.

THE Exhibition of the Institute of Painters in Oil contains the usual proportion of interesting to uninteresting works; perhaps some of the former show more force and interest than usual. It is to be regretted that it is impossible to say this of the President's contributions; his "Autumn" (241) is a half-length with even less than the usual amount of expression in the face, and not the usual amount of colour effect and picturesqueness in the costume; and as to Sir J. Linton's landscape "An Autumn Day" (333) one positively cannot tell what he is driving at. Among the strong points in the first room are Mr. Brangwyn's powerful and boldly-handled scene "A Trade on the Beach" (17) somewhere in North Africa, with the negro heads standing out against the sandy background (the texture of which, by the way, is very loosely indicated), in a manner rather reminding one of some of Professor Müller's works which used to be familiar objects at Mr. Wallis's Gallery. Mr. Kennington's "Pierrette" (39) is a clever study of a head in strong light, but not a thing quite worth Mr. Kennington's efforts. Mr. Ilope McLachlan, in "Ships that Pass in the Night" (54), has attempted to make a picture out of an indication of a rough sea in a dark night; the difficulty is to convey the appearance of water where there is hardly any reflected light; it is almost attempting an impossibility, and the picture is interesting as an experiment rather than in any other sense. A noble landscape by Mr. Wimperis, "Carting Gravel" (95), and "A Dorsetshire River" (105), by Mr. Leslie Thomson, are among the best things in the exhibition. Mr. Cotman's "A Threatening Sky" (115), is rather a bold sketch than a picture, but his "Steaming into Lincoln" (517), in the third room, is a really fine work in landscape-painting. Among works in the second room may be named Mr. Dollman's "Her Father" (200), Mr. Frampton's "Sunset, Rye" (229), Mr. Stanhope Forbes's "Paul Church Tower" (258), a rural road scene with a tower in the distance; Mr. Fraser's picturesque boat, going before the wind in the "Straits of Malacca" (299), Mr. Shannon's "The Purple Stocking" (308), a curious "side elevation," as one may call it, of a female figure with a brass salver hung up forming a kind of aureole round the head—a very interesting study in colour. In the third room Mr. Fantin-Latour's "Aurore" is a fine broadly-treated study of a figure with masses of floating hair rising through the clouds. In this room have been hung together in one corner a choice collection of curiosities of impressionist and Whistlerian tendencies, some of them hideous in colour; the only thing among them worth anything is Mr. Grier's little study called "Early Morning," with the lights of fishing-boats faintly reflected in calm sea. Mr. Fowler's "Under the Hollow-hung Ocean Green" (447) is an interesting nude figure-study treated in an imaginative manner.

THE point of attraction in Messrs. Tooth & Sons' Winter Exhibition is one of the most beautiful little works by Mr. Tadema that we have ever seen, "Past and Present Generations" (26), two figures on a terrace which is adorned with a row of carved terminal heads in marble. In the truth of the lights and shadows on the marble the artist has almost surpassed himself, and the contrast between the sculptured heads and the two living ones gives an additional piquant charm to the scene. The collection includes Sir F. Leighton's "Summer Slumber," which was in the last Academy exhibition, and several others that were seen there, as well as various other paintings of a high average of merit. M. Binet's landscape, "Near Rouen" (88), is a very beautiful and delicate work, rather unusual in style, and gains additional effect by contrast with two landscapes of the old "melodramatic" type,

by deceased painters, H. Bright and Danby, hung close to it. These memorials of a past school of art are curious indications of the length of road travelled since they were painted.

THE exhibition at Mr. Maclean's Gallery includes a life-size lion by Mr. J. M. Swan, a grand piece of drawing but somewhat feeble in the head, looking like a tamed and civilised lion. A comparatively small picture by Mr. C. E. Johnson, showing Salisbury Cathedral as the central point in a calm and sunlit landscape, reminds us pleasantly of his larger work on the same subject (but from a different point of view) which was one of the best landscapes in this year's Academy. The exhibition includes works by Messrs. Binet, Wimperis, Seiler, &c., among others a forcibly painted architectural scene, "Venice," by M. José Villegas.

THE collection of "representative" works by Anton Mauve at the Goupil Gallery is, in the sense of that adjective, a good one, for it illustrates the most characteristic qualities of his art. He is an artist who has been rather over-rated in consequence of the effect produced by one or two exceptionally original and successful paintings which became widely known. But he repeats the same note very often, and not always so powerfully as in the exceptional pictures referred to. His broad style of handling is always the same in its merits, and is quite removed from the commonplaces of art; but in seeing a number of his pictures together one is equally struck with the "dirty" colour of many of them, and the almost entire absence of sunshine. They seem to weigh on the spirits, and depress one like a cloudy day in actual weather. "The Flock Grazing" (28) is the only one in the collection which seems to show a glimpse of sunlight; everything else is a weary grey. The composition is always good and suggestive, but one comes away from the exhibition with the feeling that one Mauve is enough at a time.

UNDER the title, "The Changes in London Building Law," Messrs. E. & F. N. Spon will have ready almost immediately a small book consisting of a critical analysis of the new London Building Act, by Mr. H. H. Statham. It will give the substance of the articles which have appeared in the *Builder*, with considerable revision and some new matter, and will contain some diagrams illustrating the operation of the "horizontal line" and "diagonal line" in determining the height of buildings under the Act, and also a list of the thicknesses of walls required under the Act, reduced to the form of a schedule similar to that in the 1855 Building Act, so as to be read at a glance, in place of the cumbersome writing out of these provisions in the new Act.

#### DOORWAY OF HOUSE, CHICAGO.

THIS is one of the late H. H. Richardson's characteristically treated doorways, in a private house facing the lake at Chicago. The house is quite a plain structure otherwise, the exterior decorative treatment being concentrated on the doorway. The illustration is from a sketch by Mr. Oscar Tolhurst, an American draughtsman and etcher now resident in London.

#### LETTER FROM PARIS.

THE question, so long studied and continually adjourned of the Metropolitan Railway, seems to have entered into a new phase which will perhaps be decisive. The present Minister of Public Works, M. Barthou, whose recent visit to England has enabled him to appreciate the inferiority of Paris in regard to means of transport, has resolved to defend the new scheme with all his energy, and wishes particularly that everything shall be completed by 1900. That would be easy enough, for the plans are entirely drawn out, and theoretically one might commence to-morrow. But the approval of the Chambers and the Municipal Council is necessary. We have already explained the reasons for the hostility of

\* By another account Sir Edmund Withpool built it, in 1550.





Doorway of Dwelling house, Chicago. Sketched by Mr. Oscar Tollhurst.

the latter assembly to an innovation which would set the economical and financial conditions of the City of Paris, by diminishing the receipts of the octroi and the value of house property. Thence will arise the special difficulties the Government will encounter, in the discussion of the Metropolitan Railway question, which the Municipal Council is at present examining, from the threefold point of view of finance, street maintenance, and work beneath the street-level, in regard to which the great network of sewers will have to be modified at many points. We have also described, in its main features, the new route proposed. We need only add here that the Metropolitan Railway will include two main lines of route, A and B, intended to unite the two principal branches of the Ceinture Railway, and two other lines not yet determined, and not even submitted to inquiry. We can only hope that by 1900 the lines A and B lines, crossing each other from north and south and from east to west, and their connections with the Ceinture, will be completed. That will be one step gained. The line A, branching out of the Nord Railway line at the point Marcadet, will run under the tenth, third and first, and fourth arrondissements, will cross the Seine on a viaduct, above the Pont Sully, and after having traversed the quarters on the left bank, will join the new prolongation of the Sceaux Railway to the Luxembourg, which will have thirteen stations on its route. The line B, branching out of the Vincennes line, will also crossing the Seine on a viaduct near the Gare d'Orléans, will arrive, after nine stations, at the proposed station "Des Invalides," the future terminus of the Moulinsaux line, which will eventually become the centre for the lines from Brittany and for the State Railway, which have at present such cramped accommodation at the Mont-Parnasse station. These two main lines will have four points of connexion

at the Lyons, Orléans, Sceaux, and Champs de Mars stations, and by this system the movements of travellers in Paris will be provided for by eight complete circuits on which the various trains will be able to succeed each other, during the time of the exhibition, at intervals of three minutes. As to the two other possible lines not yet determined on, the one, according to the scheme of the Department of Public Works, is to unite the Gare de l'Est with the Gare de la Bastille, by an elevated road, with a connexion with line B; the second, which will be entirely underground, will branch from line A, with a double connexion both with the Halles and the Hôtel de Ville, and will join the existing Auteuil line at the Gare St. Lazare.

Such is the system offered by M. Barthou for the approval of the Municipal Council, the realisation of which implies the consent (exceedingly doubtful) of our rulers; unless the Government decides to step in and carry out the scheme, in the interests of the general public, without regard to minor interests. The State has undoubtedly the power to do so.

The preparations for the future Universal Exhibition, from which we are now only separated by five years, begin seriously to occupy public opinion. In regard to the competition, the continually-increasing number of competitors will require, for the public exhibition of the designs, a considerable space, and they will probably be placed in the Palais de l'Industrie, when the "Exposition du Livre" has terminated. This general preoccupation about the exhibition shows itself also among the State manufactories, which desire to celebrate the opening of the new century by an exhibition of exceptional importance. Thus the Sévres manufactory wishes to organise its own exhibition in an entirely new fashion. Recent researches have enabled it to recover a method in porcelain manufacture which permits of most varied application of colour, and on the

basis of this new procedure the management proposes, instead of installing its exhibition in the interior of the main building, as in 1889, to erect a special building offering to architects the most novel resources in colour decoration, and which will form in itself a specimen on a large scale of the work produced in the Sévres ateliers.

The designs for the competition which the Municipality has opened, for the Ledru-Rollin group of schools, are at present on view at the Hôtel de Ville; thirty-one architects have taken part in the competition. The first prize has been awarded to MM. Bourgeaud and Lecardonnell, the second to MM. Bévière and Lefevre, and the third prize to MM. David de Penanrun and Gregoire. There are few designs that are either remarkable or signed by well-known names; we may mention, nevertheless, those of MM. Hennequin, Morin-Goustiaux, Bonnier and Pierton, Gaston Trelat and Lepouzé, which merit special notice.

Among the special competitions organised by the municipal administration is that for the purification of the Seine water; 142 competitors have put in their claims, and the committee of examination has just commenced its labours. Another Municipal competition will shortly be opened for the best means for the prevention of smoke from steam-engine furnaces. It is to the credit of the Municipality of Paris that questions of hygiene are the objects of its special attention: thus it has only recently prepared a new regulation in regard to the sanitation of Paris, which provides that in every house built in Paris there must be one water-closet for each set of apartments, or for every three rooms let separately, with a sufficient and permanent water-seal, and a supply-cistern amply sufficient both for cleansing the basin and for carriage to the public sewer. The same regulation stipulates, besides, that there should be separate trapped drains for slop-drainage and for rain-water. The requirements relating to the number of water-closets and their efficient drainage apply to all houses to be built thenceforth, and may be demanded in the case of houses already built, if considered necessary for their sanitary condition. There are other regulations in regard to house drainage and connexion with the sewers which will only come into force in process of trial and in accordance with special orders of the Council during the course of the next three years, after which time all cesspools and other systems at present in use must be disinfected and destroyed, and everything be drained direct to the sewer.

These regulations, of which we have given a general summary, have been drawn up by the Sanitary Engineers' Department, whose intentions are excellent, but who have made a mistake in not having first consulted architects. The result is that there are serious omissions, and in consequence serious difficulties in the application of the regulations. The diameter and construction of the drain-pipes, and their connexion with the sewer, have been carefully specified, but nothing is said about the construction of the "Cabinets d'Aisances," the section of the basins, and other important points. The absence of any precise directions of this kind will allow the proprietor to put up anything he pleases in any fashion he likes, so long as he satisfies the regulations as to connexion with the sewer. Nor is any account taken of the deficiency of water supply to which Paris is often subject in the height of summer. In that case, unless the amount of public water supply is considerably augmented, it will in some quarters be quite impossible at times to ensure proper carriage to the sewer. Other criticisms might be made, all tending in the same direction, and leading us to regret that the "Service de l'Assainissement" did not consult some experienced architects in drawing up regulations which are of such great importance.

On the other hand, we may congratulate the Administration on the new department which has been in operation for the last year at the Hôtel de Ville, under the title of "Casier Sanitaire." This service is for the houses of Paris what the service of the "Casier Judiciaire" is for individuals. Every house has its own file of papers complete—classified, labelled, and indexed according to district and street. Each set of papers includes a minute description of the house, with sketches to the scale of  $\frac{1}{1000}$ , as well as its dimensions, the number of blocks of building and of courts, the method of drainage, the service of water laid on, and the number of separate tenements. A special paper gives the statistics of the principal contagious diseases (consumption, typhus, diphtheria, small-pox, cholera, &c.). Another paper states the disinfections carried out by the Administration in the case of contagious diseases, and the



record is completed by the sanitary inquest, by the result of scientific enquiries and analysis carried out, and by the record of the works which have been carried out by order of the "Commission des Logements Insalubres." It is calculated that it will take five years to bring the "Casier Sanitaire" entirely up to date; it will then include about 92,000 separate records of houses. It already includes 9,000 houses minutely described, and 40,000 records in regard to contagious diseases and disinfections carried out. It may be added that the Senate has recently had under its consideration a law, already passed by the Chamber of Deputies, headed "Protection de la Santé Publique."

Leaving the subject of hygiene, important if not very interesting, for those of art, we find at the Ecole des Beaux-Arts the exhibition of the designs for the Jarvin d'Attainville competition, which has just been decided. As we have already mentioned in previous years, the competition is in two sections—historical painting and landscape. In the first section the subject was a tympanum over a door, with a central circular panel illustrating the glorification of poetry. We are sorry to say that the works exhibited were exceedingly poor, both in idea and execution. Nevertheless the prize and first medal have been awarded to M. Robert Dupon, pupil of MM. Delaunay and G. Moreau. The landscape competitors had to represent a river with wooded banks, in early morning light, near a town, the houses of which were to show in the distance. Here the competitors have been more successful, especially M. Amédée Buffet, pupil of MM. J. Lefebvre and C. Robert-Fleury, who obtained the first prize.

The Académie des Beaux-Arts has just selected the artists who will take part, in 1895, in the Chenavard competition, who must send in their works from the first to the 15th April next. The following are the architects selected, and the works that they propose to execute:—M. Chiffot, "Bridge at the Mouth of a River"; M. Bigot, "A Temple to Glory"; M. Lecardonnell, "A Building for Horse Shows"; M. Bernard, "Private Chapel for a Château"; M. Héraud, "A Carthusian Convent." In connexion with the Académie des Beaux-Arts, we should also mention the architectural pupils, MM. Jaussey and Bernard, who, as the most successful during the year, have obtained the Jean Leclaire prize. We may add also that M. Pillet has been appointed as Professor of Civil Construction at the Conservatoire des Arts et Métiers, in place of M. Trélat, who had completed his term of office.

We cannot conclude this letter without a few words in reference to the Exhibition "de la Fleur," which has just been opened at the Georges Petit Gallery. It would have been a happy idea to illustrate "The Flower" in its double use as symbolism and decoration, as it has been used and interpreted by different nations: symbolical in ancient Egypt and India, native and merely ornamental in Romanesque and Medieval architecture and Medieval books. It might then have been traced through the Renaissance period and down to the present day, when it has become an important element in female costume. But this the organisers of the exhibition referred to have failed to perceive. They have merely got together a medley of furniture textiles, lace, and pictures, in which flowers have been introduced some of the latter signed by Delacroix, Courbet, Corot, and Paul Huet), along with porcelain, metal-work, &c., all bundled together without any method. It would have been easy to do better than this, and the exhibition is a disappointment.

#### THE ARCHITECTURAL ASSOCIATION:

##### ANNUAL MEETING.

THE annual general meeting of the members of the Architectural Association was held on the 26th ult., in the meeting-room of the Royal Institution of British Architects, Mr. E. W. Mountford (President) in the chair.

##### Annual Report, &c.

Mr. E. S. Gale proposed the adoption of the report for Session 1893-94. The report will be found on pages 147 to 166 of the new "Brown Book," and from it we learn that the Committee held thirty meetings during the Session, that ninety-six new members were elected, four were re-instated, and that the losses by death, resignation, and other causes amounted to ninety-eight, leaving a net increase of 2, the total number of members being 1,131. An innovation, which has had good results so far, has been the holding of a meeting of class secretaries for the discussion of Architectural Association matters from their point

of view, and the report goes on to state that much benefit must result from these students' meetings, by which means the Committee and the younger men are brought into touch with the teaching work of the Association. The Committee records with the greatest satisfaction the marked increase in the numbers attending the ordinary general meetings, and also the improvement in the financial position of the Association as compared with last Session. The Committee have viewed several premises, but hitherto none have been found suitable, but the matter is still under consideration; the need for additional accommodation is greater than ever. The attendance in the Studio and classes has been generally satisfactory, particularly as regards the number of students in the Studio and classes in Divisions I. and II. The Committee regret to report unfavourably with regard to the number of students in Divisions III. and IV. This poor attendance indicates, they think, the necessity of re-arranging these divisions. The Committee also refers to the falling off in the attendance at the summer visits.

Mr. Leonard Stokes seconded the motion, which was unanimously agreed to.

Mr. H. W. Pratt next proposed the adoption of the balance-sheet and accounts. The main feature was that they had not only been able to pay the expenses for the past Session, but had made up to the general fund the amounts taken from it to meet the deficits of the past two years. The result was that the Association started the present Session with a clean sheet. He would also like to move a vote of thanks to the auditors, Messrs. Lonsdale and Sim, for the trouble they had taken in auditing the accounts. The balance-sheet shows an expenditure for general purposes of 1,904l. 14s. 6d., in which is included the sum of 148l. 12s. 9d. carried to premises and general fund account. The income of 1,904l. 14s. 6d. includes 763l. 17s. for members subscriptions, 199l. 10s. for entrance fees, and 912l. 7s. 6d. for students' fees. The premises and general fund account shows donations of 150l. 4s. 6d., while a balance of 832l. 15s. 11d. is carried forward.

The motion was duly seconded and agreed to. Votes of thanks were also passed to those who had taken part in the late Conversazione, to the manager of the Queen's Hall, to Mr. Phéné Spiers and other exhibitors, and to Mr. Sim, the Hon. Sec. of the Entertainment Sub-Committee. Several donations to the library were announced, and votes of thanks were accorded to the givers.

##### Medals and Prizes.

The Chairman then presented the medals and prizes. He stated that they included the medals for some years past, caused by the delay on the part of Mr. Gilbert, who had kindly offered to supply a new design. The design not having arrived it had not seemed fair to keep the various winners waiting any longer.

##### Session 1893-94.

*A. A. Medal (and Book):* Mr. G. Lucas.  
*Measured Drawings Prize:* Mr. J. Allen.  
*Hon. Mention Measured Drawings Prize:* Mr. A. J. Stratton.  
*Essay Prize:* Mr. C. de Gruchy.  
*Cates Scholarship:* Mr. J. Hunt.  
*Drawing Studentship (Bronze Medal):* Mr. C. C. Brewer.  
*Oliver Prize:* Mr. T. F. Green.  
*Lecture Side: Division I.:* Mr. S. L. Crosbie, silver medal; Mr. P. J. Groom, bronze medal; Mr. H. A. Douglass, hon. mention. *Division II.:* Mr. S. Perkins, silver medal; Mr. T. E. Abbott, bronze medal; Mr. H. T. Bromley, hon. mention. *Division III.:* Mr. C. de Gruchy, silver medal; Mr. J. R. Stark, bronze medal; Mr. A. Wood, hon. mention. *Division IV.:* Mr. J. P. Clark, silver medal; Mr. A. J. Stratton, bronze medal; Mr. H. I. Potter, hon. mention.

*Studio Side: Division I.:* Mr. P. J. Groom, certificate and books; Mr. H. W. Tomes, certificate and book; Mr. F. L. H. Fleming and Mr. S. L. Crosbie, hon. mention. *Division II.:* Mr. T. F. Green, silver medal and certificate; Mr. H. C. George and Mr. E. W. Lees, hon. mention. *Division III.:* Mr. A. C. Dickie, silver medal and certificate; Mr. A. Wood, bronze medal and certificate; Mr. T. P. Dobson, hon. mention. *Division IV.:* Mr. J. P. Clark, silver medal and certificate; Mr. M. G. Pechell, bronze medal and certificate; Mr. A. E. Henderson and Mr. M. F. W. Bunney, hon. mention.

##### List of Medallists, Session 1891-2.

*Travelling Studentship:* Mr. T. A. Sladdin.  
*A. A. Medal:* Mr. A. H. Clark.  
*Lectures, 1st Year:* Mr. F. S. Hammond, silver medal; Mr. G. E. Boy, bronze medal, and Year; Mr. C. C. Brewer, silver medal; Mr. J. R. Stark, bronze medal. *3rd Year:* Mr. P. R. Smith, silver medal; Mr. A. J. Johnson, bronze medal.

*Studio, 1st Year:* Mr. R. F. Summers, silver medal; Mr. E. O. Cummins, bronze medal, and Year; Mr. J. P. Clark, silver medal; Mr. A. Stratton and Mr. F. Taylor, bronze medal. *3rd Year:* Mr. C. C. Winnill, silver medal; Mr. W. C. Waymouth, bronze medal.

##### Session 1892-93.

*A. A. Medal:* Mr. W. B. Dawson.  
*Lecture Side, Division I.:* Mr. T. E. Abbott, silver medal; Mr. G. B. Hoole, bronze medal. *Division II.:* Mr. C. de Gruchy, silver medal; Mr. E. P. Wheeler, bronze medal. *Division III.:* Mr. A. Siedman, silver medal; Mr. A. G. Bewes, bronze medal. *Division IV.:* Mr. W. K. Shirley, silver medal; Mr. M. G. Pechell, bronze medal.  
*Studio Side, 1st Year:* Mr. C. C. Brewer, silver medal; Mr. M. F. W. Bunney, bronze medal. *Division IV.:* Mr. W. C. Waymouth, silver medal; Mr. A. E. Henderson, bronze medal.

##### Certificates.

*Division I.:* Mr. T. F. Green, Greek and Roman. Mr. J. T. Bennett, Materials and Construction. Mr. S. L. Crosbie, Perspective; Mr. P. J. Groom, Elementary Physics.

*Division II.:* Mr. T. E. Abbott, English Architecture; Mr. S. Perkins, Materials; Mr. A. E. Henderson, Elementary Ornament and Colour Decoration; Mr. C. W. Surrey, Stresses and Strains.

*Division III.:* Mr. C. de Gruchy, History of Architecture; Mr. C. de Gruchy, Materials; Mr. C. de Gruchy, Geology; Mr. C. de Gruchy, Sanitary Science.

*Division IV.:* Mr. A. W. Field, Professional Practice.

##### Extra Subjects.

Mr. R. T. Grove, Plain and Solid Geometry. Mr. C. W. Surrey, Land Surveying; Mr. S. Perkins, Chemistry; Mr. A. E. Henderson, Mr. P. J. Groom, Modelling.

The Chairman next delivered the following address:—

##### President's Address.

Twelve months ago, when first I had the honour of addressing you as your President, the thought that it would fall to my lot to do so a second time never entered my mind. Fortnightly during the whole of last Session it was your fate to listen to my views upon a variety of widely different subjects, and it speaks volumes for your power of endurance that you should have re-elected me for a second year of office. My best thanks are due to you for the great honour conferred upon me by my re-election, an honour which I perfectly unsought and not less unexpected. The duties of a President of the Architectural Association occupy no little of his time, time which occasionally is very difficult to find, and in so other respects his lot is not entirely a happy one. But there are compensating advantages. One makes many friends, and is the recipient of much kindness during one's term of office, and is pleasant to be sure of receiving warm support from not only the officers and committee but from the Association as a body, whenever such support is required. I am very grateful that it is so, and desire to thank you all, and especially the secretaries and committee, most sincerely for support so given, without which no President could carry on his duties with any degree of satisfaction. When I say you have always supported me, I mean "well, nearly always," for there remains in my memory one occasion during last Session when you turned upon your President's committee (or at least the majority of the committee) and defeated us upon a division by votes to one. That you were wrong in refusing to admit women to our classes I am perfectly sure, neither do I doubt that you, or most of you, will sooner or later regret that decision.

While women are allowed and encouraged to work side by side with men in all other branches of art, and enjoy the same privileges of art education, it is a bad thing for us that we should have denied them the same facilities for the study of architecture as we have ourselves. It is edifying, however, to note the high moral tone which the opposition assumed, although it possibly a little odd that the men (or some of them) who sternly deprecated the presence of their classes of young women, unless duly attended by fully qualified chaperones, are the same men who up the river or at dances, or wherever opportunity occurs, will dare much to carry off some, or similar, young ladies to the secluded nooks they can find, as far as possible from the eye and ear of the then hated chaperone. At least I am told they do.

But, apart from this one mistake, I am exceedingly glad to say that the past Session has been most successful one, perhaps the most successful we have had under the present order of things. The Studio and classes generally have been well attended, excepting in Division IV., and work done has been distinctly good. In a



If you consider the work of an architect you will see how responsible it is, and how careful we



ought to be to carry out to the very best of our ability all that is entrusted to us. Our work is necessarily conspicuous, and its influence, for good or evil, correspondingly greater than that of a picture or statue hidden away in some gallery or church. Statues and pictures must generally be the property and delight of the more or less rich, our work is for all, from the richest to the poorest. Upon it depends in a great measure the appearance, and even the health, of our towns, and foreigners form their opinion of the country largely from the beauty or otherwise of the buildings. The words of the poet that "a thing of beauty is a joy for ever" is specially true of good architecture; but what is to be said of the bad? Doctors have this great advantage over us, that when they make a mistake it is promptly buried, while ours remain a constant reproach, possibly for centuries.

Our own motto, "Design with Beauty, Build in Truth," fairly expresses the whole duty of an architect, and happy is he who can do it. The question of what constitutes the beautiful in architecture is more than difficult to answer. There is beauty of form, mass, and outline, beauty of colour and material, beauty of detail. Failure in any one of these mars the building, and but few men can hope to attain all.

As regards beauty of outline, it would seem that a change is taking place in our ideas. Not so long ago picturesqueness was the great aim of most architects, and I well remember the mayoress of a considerable provincial town seriously informing me that a leading builder of the town (naturally an authority on the subject) had imparted to her the one way to make a building pretty, which was simply to "cut up the roof as much as possible and use plenty of iron cresting." This opinion was once no doubt more or less generally acted upon, but lately men have learnt once more that long unbroken lines and large masses of roof and wall impart a dignity and repose to buildings not to be obtained in any other way. Unnecessary breaks in the roof of a building are to be specially avoided, for they are expensive, constant sources of danger from rain and snow, and being meaningless, are certain to offend the educated eye.

In the matter of colour, one is less likely to go wrong, probably because the opportunities for doing so are more limited; moreover, in this respect time is good to us, excepting in very smoky towns. In London there can be no happier combination than red brick, Portland stone and Westmoreland slates for the exterior of buildings, and indeed they would be fairly safe anywhere; but there are many other building-stones of great beauty of colour, and both tiles, shingles and lead have good claims to consideration as beautiful roof-coverings. On this head I may well refer you to the valuable paper on "Colour in London Architecture," read here by Mr. Beale during last Session.

Of the various beautiful colour effects to be obtained internally by the use of marbles, alabaster, and glass, it is impossible to speak here. I would simply say, avoid violent contrasts, do not dot slender shafts of dark marble about an otherwise almost white interior, as one not unfrequently sees done in modern churches, and make all the use you can of British materials. Probably a good many people are unaware of the wealth of red, green, and grey marbles to be obtained in our own islands.

Beauty of detail, is, perhaps, the most difficult of all to obtain; certainly nothing more marks the distinction between good and bad architecture than the quality of its detail. The tendency of modern times has been to overload buildings with ornament of all kinds, many important buildings having been thereby spoiled. "When in doubt, turn on the carver" seems to be the principle on which many architects work, and no more fatal mistake can be made. Simplicity and breadth are the great things to strive after, and nothing more helps the appearance of a building than abundance of absolutely plain wall surface. What is more beautiful than the effect of sunlight upon a large mass of unbroken wall, where the ever-varying tints of good brick or stone have a chance of displaying themselves? Have carving by all means, but see that it is the best obtainable, and then probably the cost of it will prevent your having too much. Concentrate it, too, in masses, and do not spot it all about your elevations; then its richness gives value to the plain wall surfaces which by contrast add to the effect of the carving. It is a good plan when you think you have finished your elevations to go carefully over them again and see what features you can omit, and as you grow older you will probably find that more and more can with advantage be omitted. It is quite possible to design a noble building which

shall be entirely free of any (so-called) ornament whatever, and owe the whole of its beauty to fine proportion and materials.

So much then for designing with beauty. It is granted to but few men to be able to do it, but we can at least all try. I think it was Sir Joshua Reynolds who said that "genius is merely the capacity for taking infinite pains," and the bold assertion, although like many other similar remarks not entirely true, yet contains a great deal of truth. A man who, really loving his work, sticks to it unflinchingly, always doing his best and losing no chance of improvement, is sure in the end to produce work worthy of respect, even though he be not, and never can become, a genius.

To "build in truth" is simpler, and, requiring but good common sense, is within the reach of us all. As I understand this part of my motto, it means simply that we should use each material in the proper and appropriate manner. It is not building in truth, for instance, when one designs what professes to be a half-timber building and executes the timber in cement, as a good many architects have done. This may be artful, but it is not art, in fact it is merely a poor fraud, by no means justified by the fact that our London and many provincial building regulations bar the use of timber in this manner. A very pleasing front can be made of stucco, used as stucco, as Mr. Colcutt has shown us at the other end of Fleet-street. The use of cast-iron to imitate wrought-iron is another common fraud, and one that is quite unnecessary, because cast-iron used in the proper way can be perfectly satisfactory and beautiful, as may constantly be seen in old work. Indeed, effects can be legitimately obtained with cast-iron that it would be difficult or at least extremely costly to get in wrought. It is unnecessary to multiply instances; all that needs to be said is that every material must be used honestly, not pretending to be what it is not, and so it is easy to build in truth.

It only remains therefore to consider how best a young man may learn to design with beauty, because this is the one great business of an architect.

Well, first of all, he has to decide whether he really is fitted to be an architect, and whether he had better not turn his attention to something else. It is extremely difficult to understand the reasons which actuate many young men in their selection of the calling of an architect. Some do it under the mistaken notion that it is a genteel profession, whatever that may mean. They will soon find out their mistake, and my advice to them is to become solicitors, and so acquire the advantage of being declared to be gentlemen by a special, and often necessary, Act of Parliament. Others join us because their fond parents discover in them a "taste for drawing." Unfortunately, that by itself is a very small qualification for the practice of architecture, although of course it is a most necessary thing to possess. Possibly he might do better by becoming a draughtsman for an illustrated paper, or even a mere painter. One of the funniest reasons for becoming an architect that ever came under my notice was that it was "a nice clean business." This reason was given by a young gentleman who favoured me with a call with a view of entering my office, and who at the time was acting as assistant to a hairdresser. Thinking I was upon the point of bringing out a hitherto suppressed genius, I asked if he could draw pretty well, but was somewhat staggered by the reply, that he "did not know, for he had never tried." So I strongly persuaded him to give up the idea, which I have reason to believe he did, and this same advice I give to every young man unless he is quite sure of his heart being in the work. Unless it be, the whole thing must necessarily become the most dreadful drudgery, for probably no other profession requires so much right-down hard work as ours, if there is to be any chance of ultimate success. A man possessed of a small income and influential friends may, indeed, obtain a large practice, and, with the help of clever assistants, carry it on successfully, without having the least ability, or love, for the work, but, though he may thus become a successful tradesman, he is certainly not an architect. Of course, however, the public will not realise that; so with plenty of assurance, some good luck, and a little entertaining, he may possibly in time become even an R.A.

Supposing the imaginary young man to have made his decision, however, to have become an architect in a fairly good office, to have been admitted to our Association, and to have joined our classes and Studio, then the one and only way to learn how to design is by the constant study of

existing work. I say existing work advisedly, because it is my belief that the study of modern work is as necessary, and more useful, perhaps, than that of old work. Of course, he must study old work, that goes without saying, but by all means study modern buildings as well. The old men undoubtedly acted upon this principle; they saw what had last been done, and then proceeded to make some improvement upon it, and if we work upon these lines architecture will become more and more a living art. It is my very strong belief that there are among us now men capable of doing work better than any done here in the Middle Ages; indeed, often doubt whether we should so much admire some of our famous old work if we could see it "white from the mason's hand." Take the west fronts of Salisbury and Wells Cathedrals, for instance, two of the most admired productions of the Middle Ages. Worn by the hand of time, beaten by the winds, washed by the rains, and baked by the sun of centuries; saturated with religious sentiment and surrounded by the glamour of romance, they are most beautiful, and their contemplation fills one with delight. But if they could be done by a modern architect, and stand before us brand-new, with all their mouldings clear and sharp, and their every detail as it left the mason's hands, I do not hesitate to say they would receive very much unfavourable criticism from our shining lights. Therefore, I repeat, study old work, but do not fail to study new. There is something to be learned from it all, and though a great deal may be useful only in showing us what to avoid, there is much, very much, that is well worthy of our admiration. Take Mr. Norman Shaw's New Scotland Yard, for instance, and see how that fulfils every requirement as to simplicity, breadth, proportion, and colour. Look at the ecclesiastical work of Messrs. Gilbert Scott, Bentley, Bodley, and Pearson. Not especially how the latter obtains beautiful results sometimes with scarcely any ornament and sculpture. On the other hand, look at the work of Sedding, and see how full they are of charming detail. I could go on with the list, for there are plenty more men, and young men too, capable of admirable work, but I leave you to finish it for yourselves; believing myself in modern work, I want you to do the same.

But whether studying old or really good buildings, remember that you are not to think that by reproducing certain details of them you are doing the right thing. Quite the contrary. It is the spirit you have to strive after, the life that is in them, the evident enthusiasm and love for the work which they all show so plainly. These are not the buildings that tradesmen-architects produce, nor is the 5 per cent. commission what their designers had in view when they produced them. That 5 per cent. is a curse of our calling, and probably does us more harm with the public than we realise. You must not trouble as to whether your work is going to pay financially or not; enthusiasm is what you want, fiery enthusiasm that will carry you through days and nights of arduous toil and through years of disappointment. Spare no time, nor thought, nor labour upon your work, and then, though you may never earn the wages of a commercial traveller, and have no chance of realising the fortune of a stockbroker, you will be repaid by the knowledge that you have done good work, work that may give pleasure to generations of your fellow-men, when the stockbroker and his ways are forgotten or only remembered with horror.

Last year, in making some reference to the examinations held by the R.I.B.A., I said that it seemed to me that at least they could do no harm, so long as they are regarded merely as a means to an end and not the end itself. Whatever you do, do not get the idea into your head that the object of your work here is to pass these examinations, more or less creditably. The preparation will do you much good, and the subject you have to get up are those with which all architects should be acquainted. But remember the knowledge so gained is absolutely the minimum you must have to carry out your work decently. An architect must be a student all his days: no matter how long he lives, there will always be more for him to learn. Some changes for the better have been made in the manner of the examinations since my reference to them, notably the devotion of two days to the matter of design, and the announcement some days previously of the subject of the design. I am told the examinations are going to improve the status of the architect, give him a better social position, and procure him more considera-



on from the public. Very likely they will, and as far so good, but these are matters of very small importance after all. Perhaps by and by we shall all be registered, and then we may positively claim rank equal with plumbers and argon-dentists. It is all melancholy humbug in my opinion; an architect needs no such artificial position; his only business is to do good work, and, doing this, he will readily obtain from educated people, people of taste, as much consideration as is good for him. He knows if his work be good that there is nothing nobler, nothing more elevating that man can do, and this should be enough for any reasonable man.

Last year, also, you were good enough to prove by your smiles some remarks I made upon two other subjects—competitions and hosts—and there is but little more to say about them. What I said as to the necessity of making one condition of every competition that the author of each design should send with his drawings a formal declaration that the work is absolutely his own, has since received very strong confirmation. There have been two competitions during the year for municipal buildings in London, and in each case the successful design was entirely the work of ghosts. Now, for a man to send in, as his own design, the work of another, everyone must admit to be a downright fraud, and the man so acting ought to be punished by immediate disqualification. It is a matter that the Institute should take up strongly for the credit of the profession, as nothing can be more damaging to us as a body than the knowledge that this sort of thing is done. The ghosts themselves are by no means free from blame, but I am not prepared to sit in judgment upon them. They do their work honestly, for a more or less nominal sum, but their employers, who do not do the work, and could not do it, take all the credit and all the profit, to neither of which have they morally the least right; and after all, if the design is a good one, as it may or may not be, it is certain to be more or less spoiled in the carrying out, by the utter inability of the reputed architects to properly detail it.

Gentlemen, I have spoken at much length, but I am always understood, to young men, and have little more to say. I have endeavoured to give you good advice, and you will act upon it or not just as your views happen to agree or otherwise with mine. Upon one point, however, I hope we are all agreed, and that is to work together, shoulder to shoulder, for the good of the Association. See that there be no petty jealousies among us, no envying, and no malice, but good, honest, healthy competition, as to who can do the most, not only for himself, but for the whole body, to raise the standard of work, and to maintain, unbroken, as handed down to us by our illustrious predecessors, the glorious traditions of the Architectural Association. Remember the words of our very own immortal and up-to-date bard:—

"Times may alter and years go by,  
But we still the A.A. love;  
Build in truth is the flag we fly,  
Design in beauty above;  
Years may roll and centuries fade,  
Still o'er our heads shall play  
The glorious flag of the Old Brigade,  
The Standard of the A.A."

Mr. W. H. Seth Smith said he had pleasure in proposing a vote of thanks to Mr. Mountford for his admirable address, which he felt sure would be looked upon as an inspiring and practical one. On the question of admitting women to the classes, he (the speaker) had happened to differ from the majority of the Committee, and yet he agreed to a great extent with the policy which had been pursued. He was fully in favour of admitting women to some of the privileges of the Association, such as the lectures and classes, but he would hesitate to admit them to the common rooms. Mr. Mountford had referred to the curriculum of the Association, and was most gratifying to find that 70 per cent. of the members were students of the classes. He scarcely thought they could not have expected a more satisfactory result, but, at the same time, they looked for improvement every year. On the subject of art, their President's remarks were very enthusiastic and practical. As a teaching body, they might certainly claim to be more enthusiastic in favour of art than any other body or college in the metropolis. Not only did they go in for art most enthusiastically, but they were able, from their experience as practical men, to give it that particular direction which was so essential to the scientific work of an architect. The address had also alluded to their "foreign policy,"—to the action they had taken in reference to the

Buildings' Act, and the modifications in that Act, which their representations would, to some extent, have influenced. The question also of the Workmen's Conference was a very important one. He had the honour of being on both those Committees, and he did not believe they could over-estimate the importance of this question of the education of the workmen, if their works were to be all that their ambition would have them be. Then came advice to the students, and what could be more practical than the recommendation to study modern work of the best kind. They owed great thanks to the President for again pointing to that important subject. As to the method of remuneration, he felt most strongly with Mr. Mountford, that it should be altered, and he hoped it would be the work of the Association to bring great pressure to bear in all directions in furtherance of that important reform. He was glad that the Association had at its head a practical and able man like Mr. Mountford, and members should be very grateful to him for accepting so arduous a task for the second time.

Mr. Aston Webb, in seconding the vote of thanks, congratulated the President on commencing his second year of office. It was the highest honour the Association could bestow upon any member. He (the speaker) believed that the same wise course which had been pursued in the past was still being followed. Those who were outside looked upon the extensive scale on which the new education scheme was started with something like awe, but the fact that it had been curtailed to some small extent only showed how well it had been carried out. One point in the address especially appealed to him, because he had more than once ventured to mention it there, viz., the advisability of studying work by modern architects. He believed that study was being more and more carried out, and there was never a more favourable time for it than the present. One was sometimes asked after erecting a building what was its style; one was almost compelled to invent a style at the moment to satisfy the questioner. Fortunately, however, it was being considered less and less necessary for the architect to follow a particular style. The present seemed to be the most delightful time for the young architect to enter on the art of architecture. He had the opportunity of studying the old styles, and when he commenced his practice he would be able to give rein to his imagination. The buildings erected by those architects whom the President had mentioned would become the nucleus of tradition, which the young man might follow, unhampered by the necessity of style, and this natural development would interest far more than the repetition of old features or styles. The mere repetition of old work could not raise enthusiasm as it once did, but only that which was individual work. The President had referred truly to the serious and important nature of an architect's work. It was not knocking off a little sketch, but referred to things which had to be executed in brick, and stone, and marble, and were meant to last. The more they could realise how the work would look when executed, and not merely how it appeared on paper, the better it would be, for their efforts would be judged not by the personality of those who had done them, but by the results. There was always something pathetic in looking at a building when the man who had designed it had passed away. As one looked at the portions of a building, and saw the infinity of work put in by the designer, one could still see the living spirit left in it, even although the architect was dead. If they would follow in the same path, they must secure for their buildings the element of permanence. He had sometimes noticed that the hand of time was not altogether impartial; in the case of bad work it appeared to smear and dirty it, and to make it worse and worse, so that the older it got the more wretched it looked. But with a good work the hand of time seemed to touch, and tint, and improve it, so that it became more and more beautiful. The only thing which would secure permanence in a building was that it should have some beauty of form or colour, which would make it worth while for people to retain it.

Mr. Leonard Stokes supported the vote of thanks, and said that the advice given them by the President to study new as well as old work was excellent, and if the members would follow it and take Shaw, Bodley, Bentley, and such men, and improve upon their work, they would have done something. He believed that the mistake was often made by young men of imagining that everything old must necessarily be good, when

they ought to look at old work with something like the same discrimination as they looked at the new. He should like to congratulate the President and the Committee on the excellent list of papers they had got together for this year; it ought certainly to produce a good attendance of the members. He was glad to hear that the new scheme was working with a large amount of success. They had not been told anything about the vexed question of new premises, although the Committee had been looking for them for the past four or five years. It was better, perhaps, however, to put up for a time with premises which were too small for their requirements, than to take others before they really knew quite what they wanted.

The vote of thanks, on being put to the meeting, was carried by acclamation.

The Chairman thanked the members for the manner in which they had received his address. He added that, of course, they must discriminate as to what modern buildings they were going to study, and he had endeavoured to give a few suggestions as to what were good buildings. They could not go wrong if they studied the buildings illustrated from time to time in the "A.A. Notes." These illustrations were necessarily limited in number, as they had not the money to pay for more; but the scarcity of the illustrations had one good point—they were all well worthy of study.

The proceedings then terminated.

### ARCHITECTURAL SOCIETIES.

**BIRMINGHAM ARCHITECTURAL ASSOCIATION.**—On the 26th ult. the twentieth session of this Association was opened with a conversation, exhibition of drawings, and smoking concert, Mr. W. Henman, A.R.I.B.A., the new President, occupying the chair. After a few introductory remarks, he presented the prizes to Mr. W. J. Frichard, for the best set of measured drawings prepared from sketches made on the sketching excursions, to Mr. Gerald McMichael for the best essays upon the subjects dealt with at the construction classes, and to Mr. E. B. Clarke for the best descriptions of buildings in course of erection visited by the members during the past session. This section forms an important part of the Association's educational programme. The musical portion of the evening's entertainment was then proceeded with. The drawings were a very interesting collection, kindly lent for exhibition (which remained open until Tuesday morning) by the following architects:—Messrs. Ernest George & Peto, H. H. Wilson, James Brooks & Son, Ernest Newton, Francis Masey, Arthur Bolton, Reginald Blomfield, E. J. May, Andrew Prentice, R. A. Briggs, Gerald Horsley, Phéné Spiers, H. Hennings, W. Fleetwood, and Douglas Fordham. Drawings were also lent by Messrs. E. C. Bewlay, Arthur Harrison, Victor Scruton, J. A. Swan, A. J. Dunn, J. Ward, and others of Birmingham.

**CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING ASSOCIATION.**—The annual general meeting of this Association was held in the Town Hall on the 24th ult. The business consisted of the election of various officers: Mr. C. Lonsdale being elected President, Mr. E. F. Ruthven and Mr. F. J. Nickols, Vice-Presidents. A letter of resignation was read from the late Hon. Sec., Mr. J. Rush Dixon, now residing in Walsall, and it was resolved that the best thanks of the Association be forwarded to Mr. Dixon for his former able services. Mr. E. B. Newton, City Surveyor's Office, was appointed Hon. Sec. and Treasurer. The annual balance-sheet was read, showing that financially the Association is in a most flourishing condition. The opening meeting of the Session 1894-5 will be held in the Town Hall, at 8 o'clock p.m., on Wednesday, November 7 next, when the President will read the opening address. A satisfactory list of papers has been arranged by the Hon. Sec. for the ensuing Session.

**THE PARLIAMENT HILL FIELDS "TUMULUS."**—The work of excavating the ancient mound, or "tumulus," in Parliament Hill Fields, adjoining Hampstead Heath, was commenced on Monday, under the personal supervision and direction of Mr. C. H. Read, of the British Museum. About one-half of the mound has now been removed, the soil thus far consisting of a loamy sand; but the only object of interest yet found is a large old-fashioned musket bullet. Whatever the result of the present investigations, the mound will be restored, with the same material as that now being removed, to its old condition.



## Illustrations.

## BATH ABBEY.\*

**T**HE early Monastery of Bath, founded originally for secular canons, was destroyed in 1088, and on the granting of the monastery by William Rufus to Bishop John of Tours, or Villula, Bishop of Wells, a new church was commenced by him in preparation for the removal of the Somersetshire See from Wells to Bath.

Of this Norman church we have some interesting remains, and from these it is clear that it was on a far larger scale than the present building, the nave of the Norman church being nearly of the same length as the whole of the present church, the central tower and eastern arm occupying the space eastward of the present choir, now a roadway. The church commenced by John de Villula was completed by Bishop Robert, but in subsequent centuries the monastery became much neglected, so that when Dr. Oliver King was translated from Exeter to the See of Bath and Wells in 1496, he found the church in a sad state of ruin.

A new church was commenced, the west front being slightly to the west of the Norman west front. Its design has been attributed to a dream or vision of the Bishop, who is represented as having seen the Holy Trinity with angels ascending and descending, while a voice cried, "Let an Olive establish the Crowne, and let a King restore the Church."

How far Bishop King completed his work does not now appear. He died January 24, 1503-4, and his work was carried on by Prior Birde. Some considerable progress must have been made with the choir, as Birde built a chantry for himself on the south side of the sanctuary. He died in 1525. His successor, Prior Holloway, although he endeavoured to complete the work, was compelled to deliver up his monastery to the King, June 27, 1539.

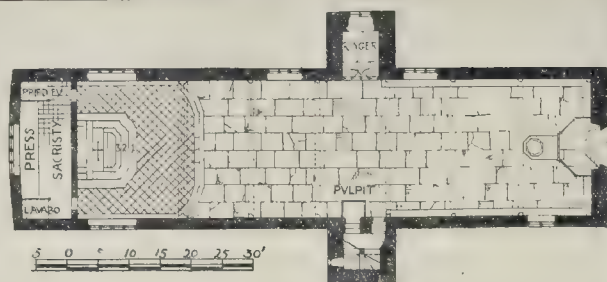
Cardinal Adrian de Castello would seem to have been a contributor towards the vaulting of the choir and its aisle, and his arms are still to be seen. Of the other Bishops between the time of Bishop King and the Dissolution—Cardinal Wolsey, Bishop Clark, and Bishop Knight—none seem to have contributed to the completion or adornment of the church. After the Dissolution the church was offered to the town for 500 marks. This, however, was refused, and in 1560 Edmund Colthurst "made the city a present of the carcass of St. Peter's Church, with the ground upon the east, west, and north sides of it," and the old abbey house was likewise sold.

Various attempts had been made to revive the interest in the church, but it was not until Bishop Montague's time that the building was completed, the vestry was built by Sir Nicholas Salterus, and many others contributed towards the glazing and paving. A long list is given in Appendix V. of Britton's "Bath Abbey Church." The date of its completion was about 1616.

Although late in date and poor in many of its details, there is no lack of dignity in its general exterior effect, and the interior is very imposing.

It is symmetrical on plan, having a nave of five bays with aisles, and a choir of three bays, also with aisles. The central tower is oblong, and the transepts are narrow and aisleless. In the angle of the south transepts and choir is a small vestry, which is in the parish of St. James. The aisles of the choir do not terminate in the usual way, but have porches. From the remains of the Norman work this unusual planning may very possibly have been suggested by the earlier work and the use that could be made of the old foundations. There are three doorways in the west front and two in the south aisle. Although some time elapsed between the foundation of the present church by Bishop King and its completion by Bishop Montague, the original design was evidently adhered to, and the effect is consequently of a church built at one period. This has been further carried out by the restoration by the late Sir G. G. Scott, who completed the vaulting of the nave and its aisles to correspond with that in the choir. Restoration also included the placing of pinnacles on the tower, and the building of flying buttresses to the nave to resist the thrust of the stone vault. The preparation for these buttresses is shown in old engravings of the church. During the restoration the foundations of the Norman church were

\* The series of the "Abbeys of Great Britain" is continued this month with illustrations of (No. VI.) "Bath." Particulars of this and of the three Cathedral series ("England and Wales," "Scotland," and "Ireland") will be found on p. i.



Design for a Village Church.—Plan.

discovered. We shall refer to these in detail later.

The church, though at one time partially hidden by buildings, is now isolated, and a paved space surrounds it on all sides. To the west are the old Roman Baths, and the clearing away of the buildings which covered these has opened out a fresh view of the Abbey Church. This view, taken from the roof of one of the present baths, we give this week. In close proximity to the Roman Baths was a temple of Minerva, which stood west of the site of the present Abbey Church, and the ground was occupied by the Church of St. Mary-le-Stalls, now destroyed.

The west front, said to represent the vision of Bishop King, is the most striking point in the exterior. A large seven-light window occupies the centre over a deeply-moulded doorway, and flanked by octagonal turrets. The aisles have doorways with four-light windows over. On the face of each of the turrets is sculptured a ladder with angels ascending and descending, and at the bottom are figures in adoration. Canopied figures of the Apostles occupy the canted sides of the turrets, and the space between the great window and the low-pitched gable above is occupied by figures of angels, with the Trinity under a large canopy in the centre. Shields, now defaced, are also introduced, and probably bore the arms of Bishop King and those of the See.

On the face of the aisle buttresses is an olive-tree springing from a crown, with a mitre over, in allusion to the name Oliver King. Over the west window of the north aisle are the words, "Dominus mea," and over that on the south, "Dominus oronis" in black letter. Flanking the central doorway are effigies of St. Peter and Paul; the spandrels of this doorway have the emblems of the Passion. The doors themselves are of late date, given by Sir Henry Montague, Knt., brother of the bishop, and Lord Chief Justice of the King's Bench. They bear shields with the arms of the Montagues and the See of Bath and Wells. The nave is lighted by lofty five-light transomed windows in the clearstory, and five-light windows in the aisles with four centred arches. The same design is carried through the rest of the church. Each bay of the clearstory is divided by a pinnacle and finished with an open embattled parapet. The central tower is oblong, with massive angle octagonal turrets, and rises two stages above the roofs. On each face in each stage are two windows set in rectangular panels. Those on the first stage are blocked. The two central lights of each of the belfry windows are pierced. The design of the choir and its aisles is in nearly all respects the same as that of the nave. The east window is of seven lights, with a square head. The angle-turrets are square on plan to the parapet level, and afterwards become octagonal. The design of this front is perhaps the least satisfactory part of the whole.

It must be admitted that the interior of this church is a great deal finer than the exterior. The design is very simple, but the large windows, the lofty proportions of the central aisle, and the rich fan-vaulting of the roof combine to make a very impressive whole. Unfortunately, the organ-screen under the tower was removed at the restoration, and the interior has lost much in consequence. The fittings are new throughout, and most of the monuments are of little interest. Two, however, demand attention. The first, a Chantry Chapel, erected by Prior Birde on the south side of the high altar, filling the easternmost bay. It is of two bays, Late Perpendicular in style, resembling many other chapels of its date in details. The spandrels and cornice are rich in carving, and on the vaulting at the east end are the arms of Prior Birde, surmounted by the mitre and pastoral staff. On

various parts of the chapel are the initials W. and a bird, in allusion to the name of the builder.

Still later in date is the second monument of importance—that of Bishop Montague in the tower, occupying the second bay westward of the tower. It is of Renaissance design, and has a recumbent effigy on an altar-tomb, the sides of which are decorated with heraldic shields. The whole is surrounded by massive iron railing. The only old glass remaining in the church is a series of shields of arms in the windows of the clearstory of nave transepts and choir, numbering about sixteen in all. They are apparently of Early seventeenth-century date, and are probably the arms of benefactors, many of whom contributed to the glazing of the windows.

During the restoration by Sir G. G. Scott, interesting remains of the Norman church of John de Villula were discovered below the present paving. They have been covered by gratings, and are now visible, about 5 ft. below the present floor level. They are shown on the special prepared ground-plan we here give. Beginning at the west end, we have the remains of a portion of the jamb of the Norman west door, and again the bench of the south aisle is a small column. Opposite the second and third columns of the nave arcade are remains of the Norman piers with semi-circular columns in pairs on each face. A third pier remains on the north side of the sanctuary, and in the angles of the east porches and outside the eastern buttresses the aisles are the fragments of two large piers, having a large circular column apparently detached parts disengaged attached to the inner arches. These masses of masonry undoubtedly are remains of the two western piers of the Norman central tower. From what remains were enabled to obtain the following results: The Norman nave was of eight bays. The central aisle was slightly wider than that of the present church, but the walls of the aisles would seem to coincide. Allowing for the extra thickness of the Norman piers, this would reduce the width of the Norman aisles to about 13 ft., the present Norman aisle being 4 ft. wider. The west front window feet eastward of Bishop King's front, and western piers of the central tower formed the foundation of the eastern transepts and buttresses of the present choir. Eastward was the Norman choir, perhaps terminating in an apse, occupying the space now a roadway.

## DESIGN FOR A VILLAGE CHURCH.

This design was made as a study for a village church or hamlet chapel. The material intended to be used are brick and rough-cast with the walling, with stone dressings.

Of the two turrets, that on the north side contains the stairs, that on the south the bell-chamber, which access is given by the bridge.

F. C. EDWARDS.

## HIGH ALTAR, MOOSBURG,\* BAVARIA.

The drawing which we publish was exhibited at the Royal Academy this year by Mr. J. H. Brewer; it represents a very remarkable relic of a church in Bavaria. This fine work is executed in red pine very richly painted and gilt; it is 60 ft. high, and stands upon the stone foundations of the high altar.

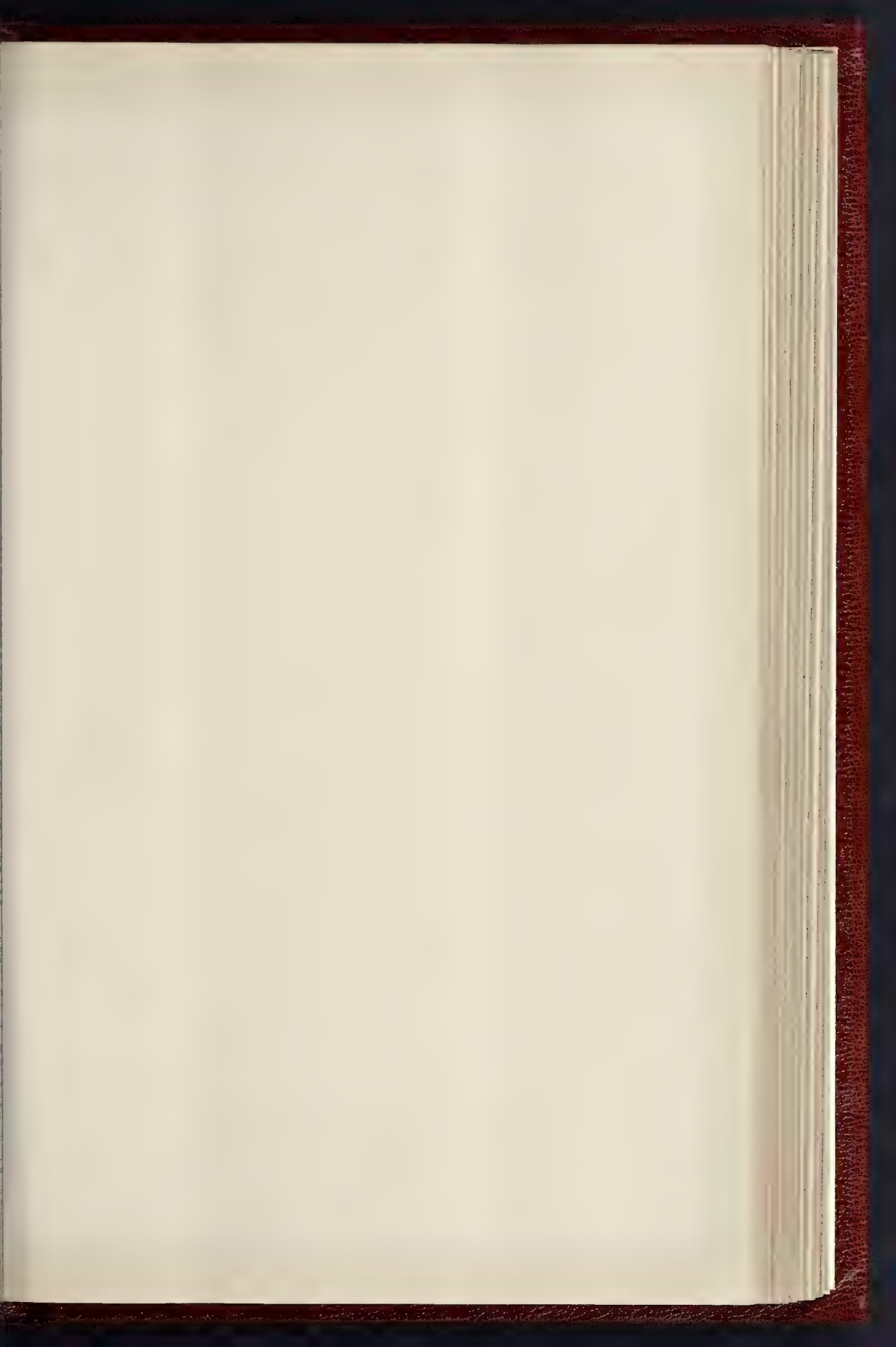
There are several points of interest about the reredos to which we will call attention.

In the first place the exact date is known; it appears upon the work 1462, also the name of the donor, Duke Louis "the Rich."

This reredos differs from most in Germany in the fact that it is not a triptych, nor is there a central panel.

\* Sometimes spelt "Mosburg," but the double 's' is generally used to distinguish it from Mosburg in Styria.



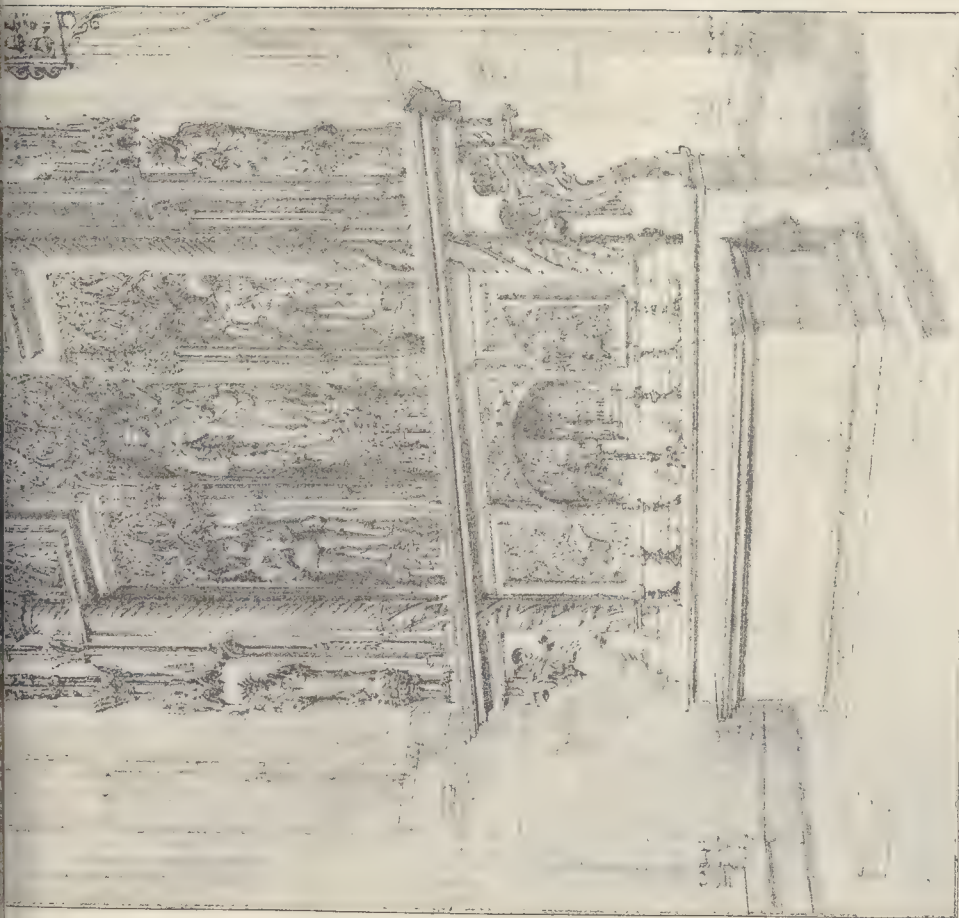


THE BUILDER, NOVEMBER 3, 1864



Die Frau Kirche  
1864  
given to the church  
by  
DRESDEN SOCIETY  
1467



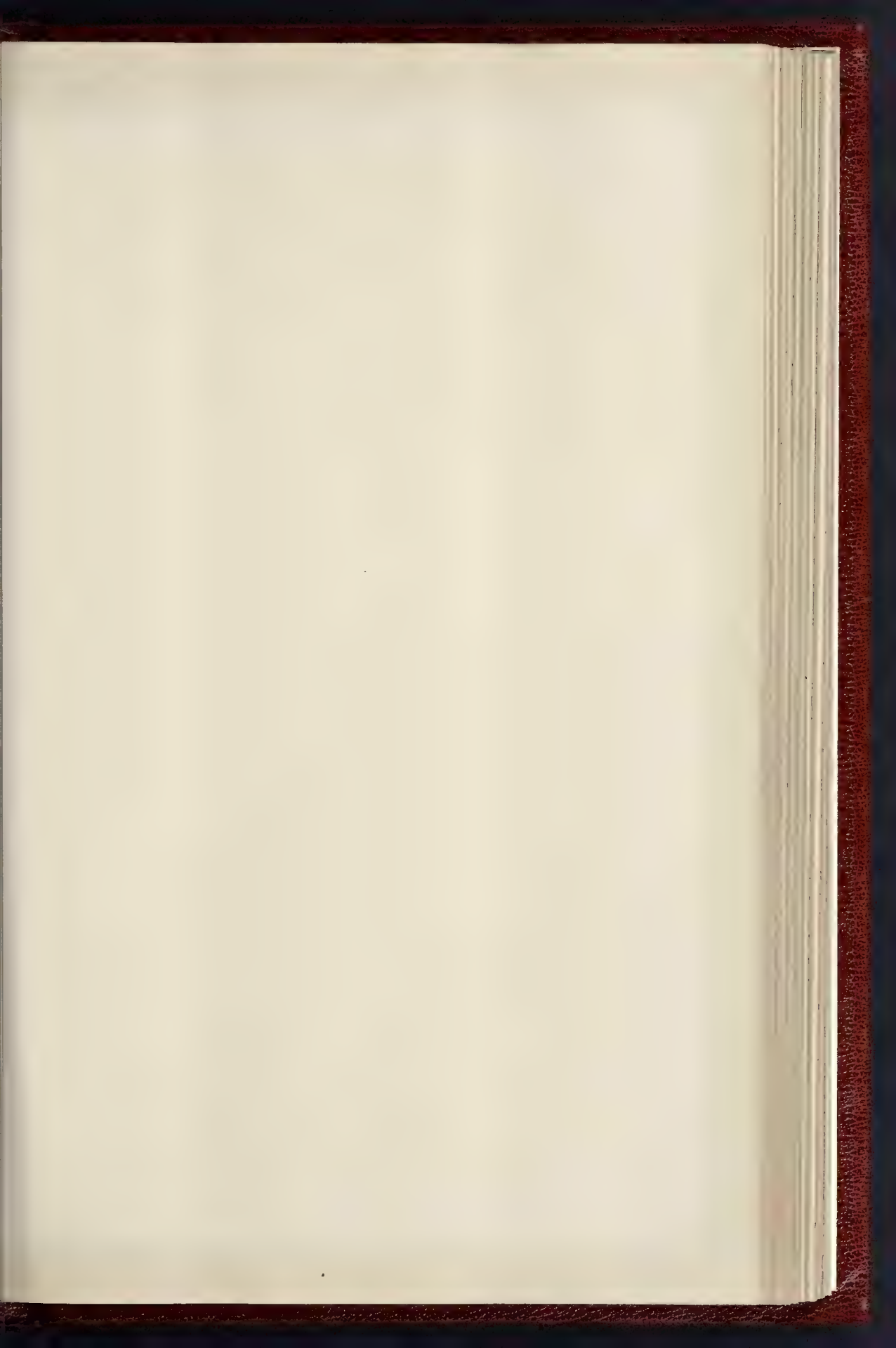


THE ALTAR, MOOSEBURG, SAVARIA. DRAWN BY MR. H. W. BREWLER.

HIGH ALTAR, MOOSEBURG, SAVARIA. DRAWN BY MR. H. W. BREWLER.







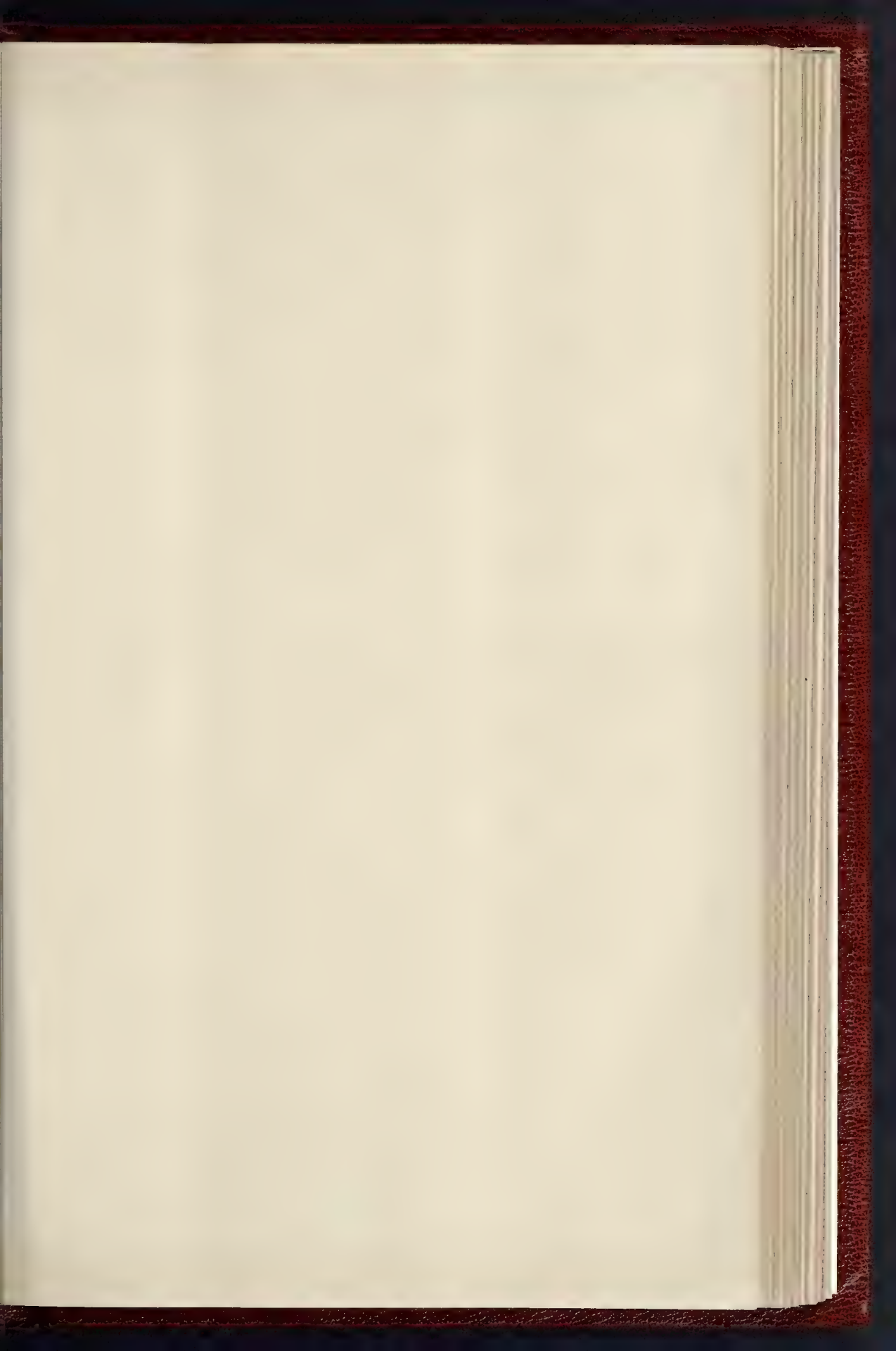




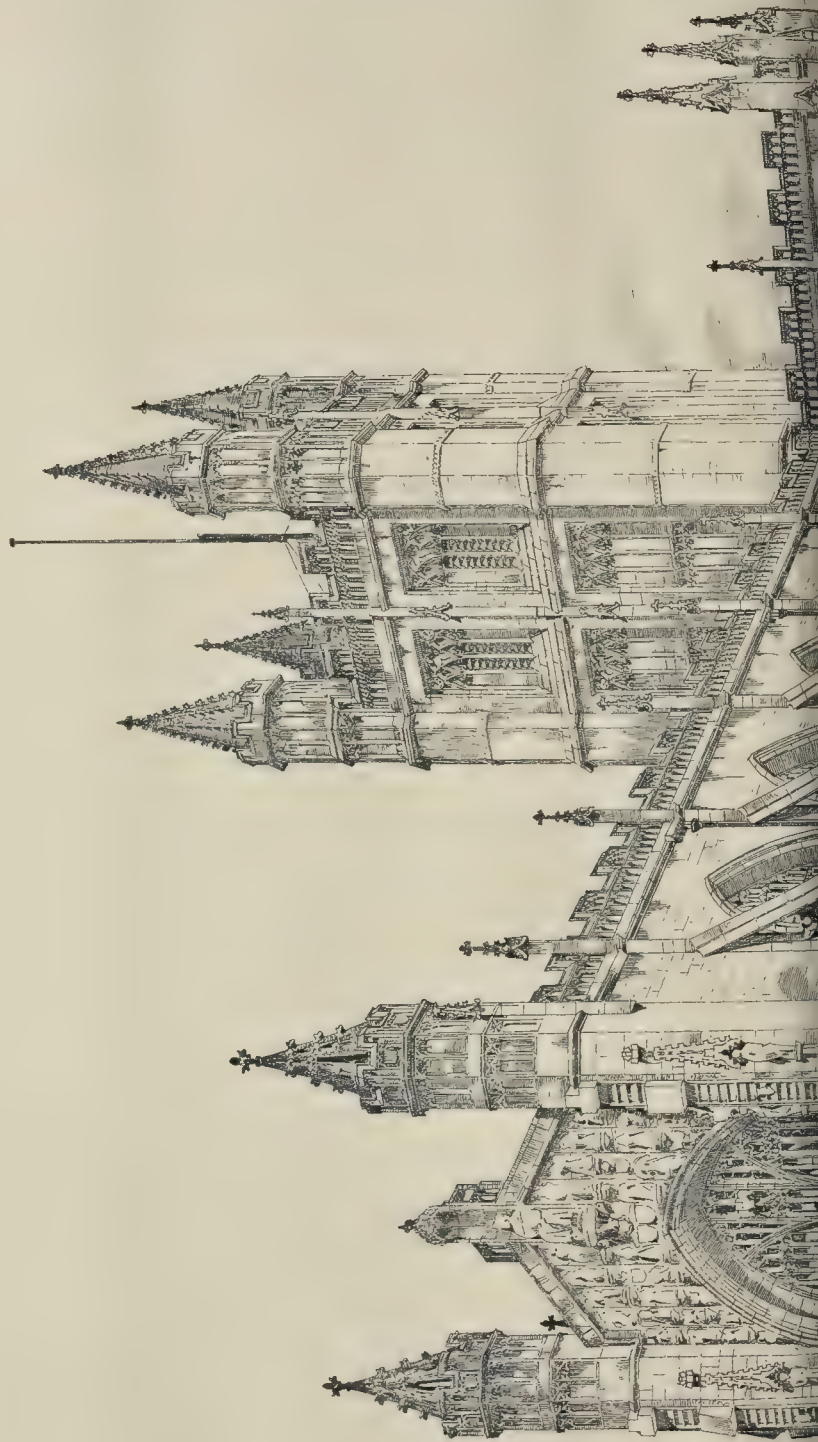




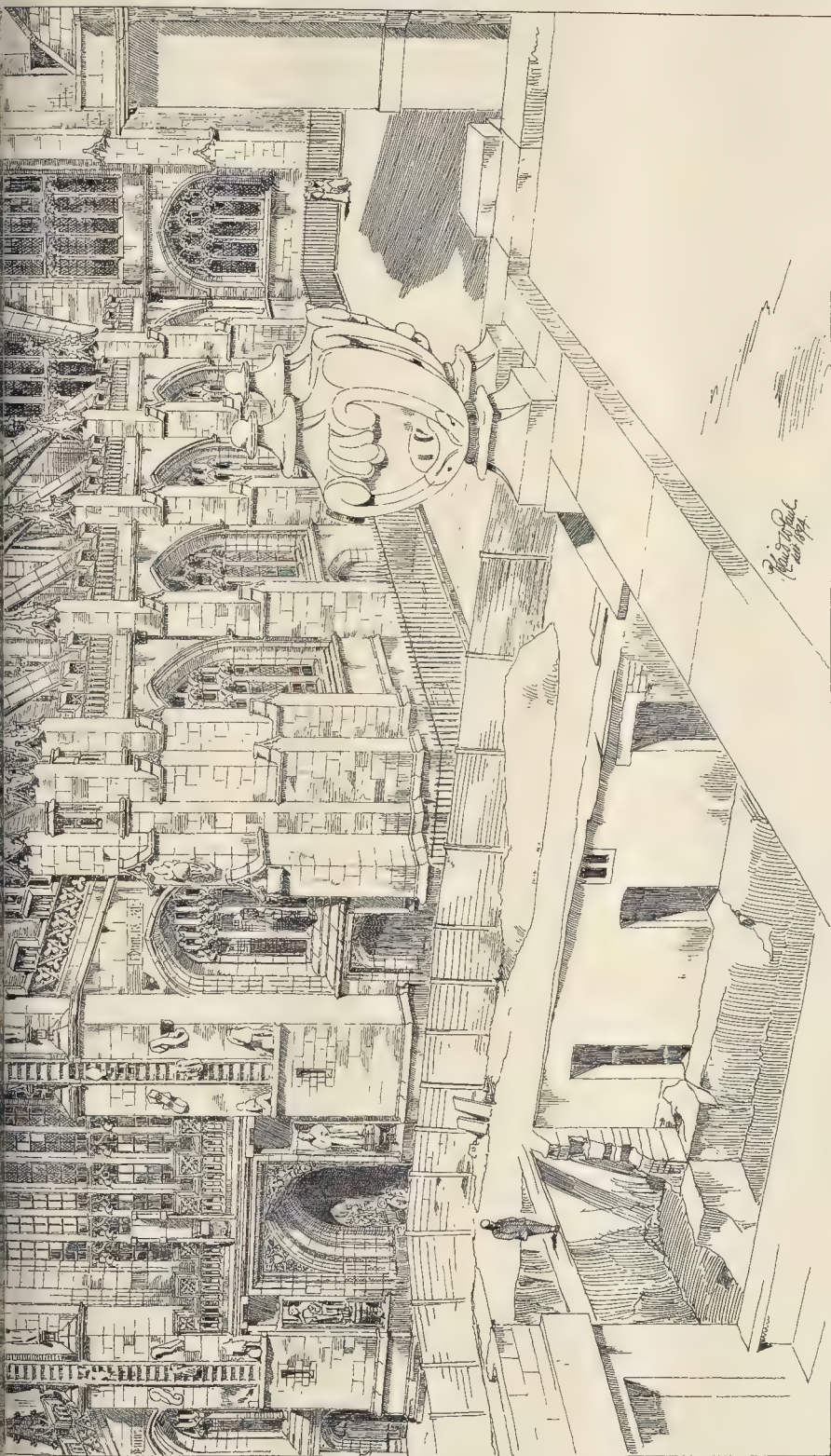




THE BUILDER, NOVEMBER 3, 1894.







THE ABBEYS OF GREAT BRITAIN.—No. 6. BATH: FROM THE SOUTH-WEST.

DRAWN BY MR. ROLAND W. PAUL.

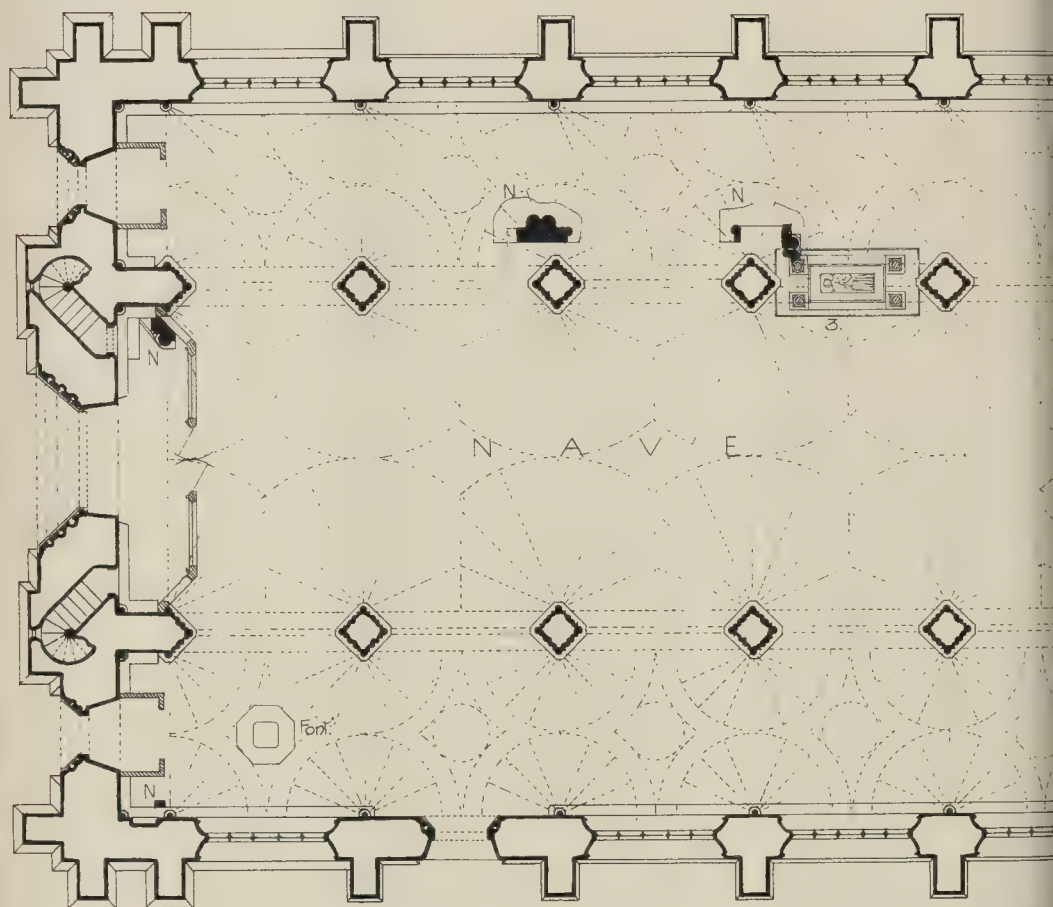
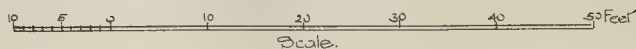






# BATH ABBEY CHURCH.

## Ground-Plan.



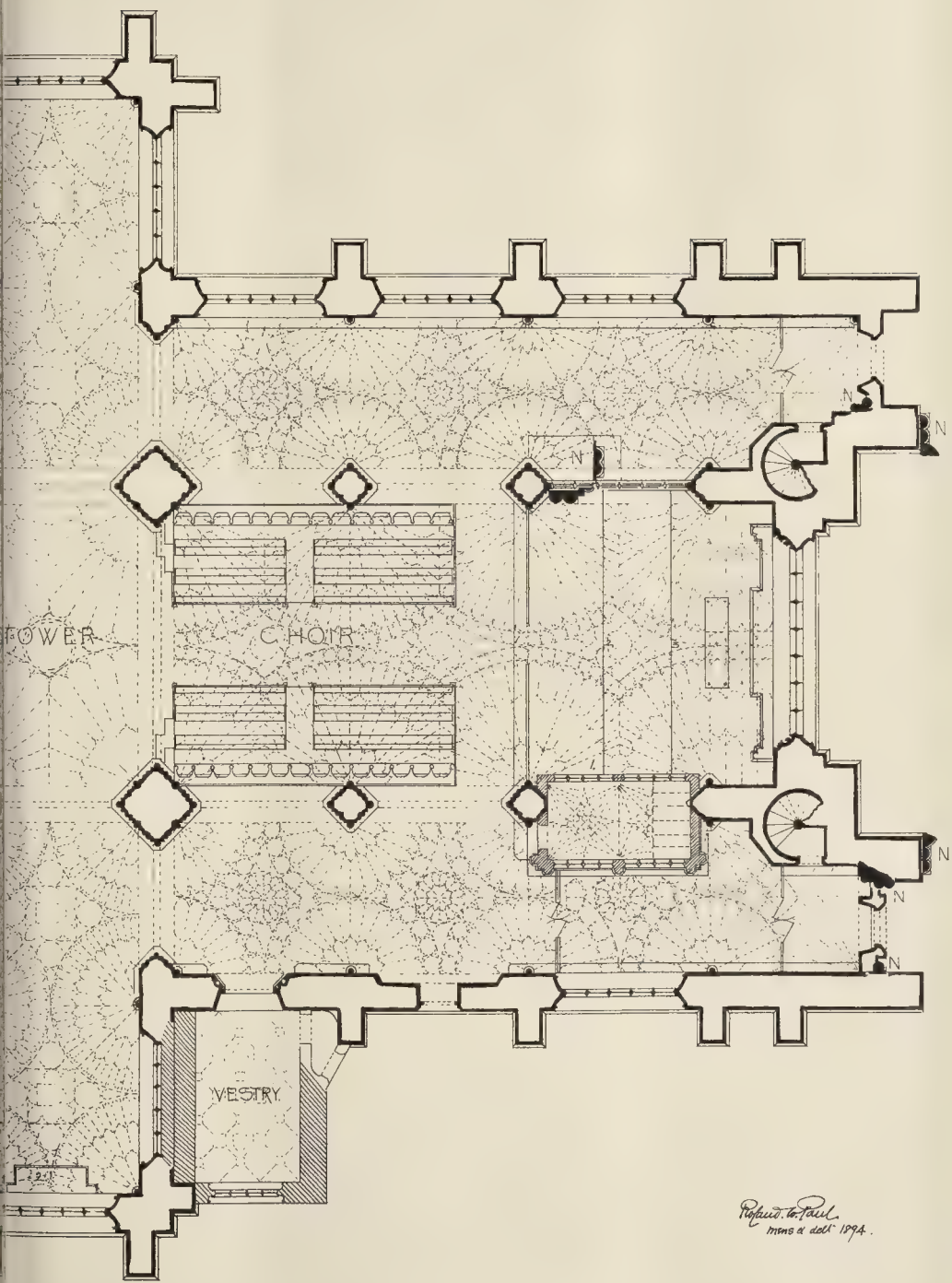
### Monuments

1. Chantry of Prior Birde.
2. Monument of Sir Wm Waller & wife
3. " Bishop Montague.

Note: N.N. Remains of the Norman Church of John de Villula  
Those in Nave & Choir are below the  
present floor level & covered by gratings.  
The remains outside east end are  
slightly above level of paving.

The vaulting of Nave & its aisles has  
been copied from the ancient vaulting  
of Choir & formed part of Sir G. Scott's  
restoration.





*Revised to Paul  
mms of date 1894.*





pearance of its ever having possessed doors—fact, it may be fairly concluded that it is now as originally designed.

Another very remarkable, and, we believe, quite a feature, is the great triangular canopy or dachino projecting from the upper portion of the reredos. It would appear that the idea of architect was to combine the ideas of a dachino and an open pierced reredos, and, it is to be seen in the cathedral at Augsburg, and in other Bavarian churches and galleries.

The little shrine over the altar is modern, but the doors of the cabinet enclosing it are beautifully painted by the elder Holbein (grandfather of the celebrated portrait painter). The back of the reredos is almost as elaborate as the front. It forms a different composition with a large figure in the centre, which is also attributed to the elder Holbein; it may, however, be doubted whether it is not by Zeitbloom, or Burkair, whose works are to be seen in the cathedral at Augsburg, in other Bavarian churches and galleries.

The church at Moosburg contains a good set of stalls, and one or two carved monumental figures, but has not much else of interest; nor is there anything in the town or immediate neighbourhood worth visiting. The churches are chiefly all in the German-rocco style (the worst of architecture that ever existed), the mestic work modern, and the scenery tame and poor. How this fine reredos has escaped is probable, as all others in the district were destroyed during the seventeenth and eighteenth centuries, and replaced by the most miserable anti-Classical works. One would not have been surprised at finding a fine reredos on the Lower Upper Rhippe, Westphalia, in the Tyrol, or the Tyrol district, but here it is quite solitary, and comes upon one as a surprise.

#### EGYPT EXPLORATION FUND.

THE annual meeting of this Fund was held on the 26th ult. at the rooms of the Zoological Society, Hanover-square, Sir John Fowler presiding, when the report for the year 1893-4 was presented, the most interesting portion of which related to the excavations carried on last year by an expedition led by M. Edouard de Sarte, Mr. Newberry, and Mr. D. G. Hogarth, which was engaged in clearing the ruins of the great temple known as Deir-el-Bahari, a small ruin of which was explored by Mariette earlier in the century.

In the evening another meeting was held under the presidency of General Sir Ch. Wilson, to hear the lecture by M. Naville, which was illustrated by a series of lantern views reproduced from the photographs of one of the artists attached to the expedition, Mr. Howard Carter. The most complete exploration of last winter proved, he said, the erroneousness of the production of the Temple by Mariette, who had scarcely cleared one-third of the site, and it demonstrated that the monument consisted not of one but of a series of temples built on three platforms or terraces rising one above the other, the third temple resting against and rising partly cut out of the solid rock. It was the work of Thothmes III., as some of the inscriptions, when superficially examined, reported, but of Queen Hatshepsut, his aunt and guardian, the daughter of Thothmes II., of the 18th Dynasty. Among the numerous inscriptions covered by the expedition was one which expressly enjoined the people to obey "the king, the daughter," as he called the young queen, who was presented in all the sculptures in the garb of a female ruler, and generally with a great beard. It is circumstance made it easy for the successor Queen Hatshepsut, by erasing a few leading words in the inscriptions and by changing the cartouches, to claim credit for the splendid monument of which he appears to have been envious, although it is to be seen in the cathedral at Augsburg, in other Bavarian churches and galleries. The inscription was partly actuated in making the queen by a spirit of revenge towards his guardian, who perhaps subjected her ward to the discipline of a very imperious will. The inscriptions proved the daughter of Thothmes II. to have been a really great queen, who greatly extended commerce and encouraged art, particularly architecture, in her kingdom, and entered into international relations with surrounding peoples. She had fleets of ships, which traded on both sides of the Red Sea, but particularly on the African or Somali coast, representations of ships being found laden with the tusks of elephants, a special kind of monkeys, and the trees, which, on being transplanted, grew well in Egypt. These ships brought precious metals, especially gold, and, as cuneiform inscriptions showed, Western Asia received quantities of gold from Egypt and sent it back in

the manufactured state to Egypt or Phenicia. They had found many evidences of commercial intercourse which was certainly far greater than we had hitherto supposed. When the inscriptions describing the naval intercourse of the period had been more completely studied, it would probably be found that many of what had been regarded as evidences of conquest were in reality the vestiges of trade and commerce. The art antiquities found, many of which were of the most exquisite workmanship, and which in age probably corresponded with the Early Mycenaean period, could not fail when adequately investigated and studied to throw a flood of new light upon the relations between Greek and Egyptian Art. The tomb of Thothmes II. was quite unique. There was no other example in Egypt of temples within temples, and of colonnades so perfect as the two found in the second of the two temples discovered at the northern end of the site, the end opposite to that which Mariette had explored. At the end of the upper platform they had found many objects of unique interest, most of which were exhibited on the screen. Among them were a colossal head of Queen Hatshepsut, a great white altar, and an inscription which stated that the queen had built an altar of white stone, a rock-temple, the funerary chapel of Thothmes I., and on one of the terraces M. Naville had come upon one of the finest emblems of ancient art in existence. It was the side of an ebony shrine covered with ornaments on both sides, all made of little pieces of ebony, beautifully carved, each piece separately secured to an ebony peg. Among the most interesting of the architectural remains unearthed and shown in the photographs were several very perfect colonnades with quite Doric capitals, which had sixteen-sided capitals, containing many of the characteristics of Doric capitals. One view showed a group of five of these columns, another of eight columns seemed intended to form part of a covered colonnade that had never been finished, and one complete colonnade presented fifteen rows of columns, having all the beauty of a Greek temple and resemblance to early Grecian architecture of the most striking character.

In the discussion which followed, Mr. Bayliss, O.C., Sir Charles Wilson, and Mr. D. G. Hogarth, took part. The latter said M. Naville had in no way exaggerated the importance of the temple, which was one of the most extraordinary that had ever been discovered. There was nothing elsewhere like it. It looked like a number of temples built one on another. The whole history of the reign of Queen Hatshepsut was probably told in those temples. What had been discovered so far was of the greatest importance, but it was, perhaps, almost trivial compared with what might be expected next winter, for Mr. de Morgan, the director of the Museum of Gizeh, intended to have 1,000 men on the works. In response to a very cordial vote of thanks M. Naville said he hoped to have a great deal more to tell them of the matter next year.

#### NATIONAL FREE LABOUR ASSOCIATION.

THE second annual congress of the National Free Labour Association was opened on Tuesday at the Foresters' Hall, Clerkenwell-road, and was attended by delegates from Hull, Liverpool, Middlesbrough, Norwich, Newcastle, Southampton, Swansea, Dublin, Plymouth, Sunderland, and other provincial towns.

Mr. John Chandler having been elected to the chair,

Mr. W. Collison (Secretary) read a number of communications. The Marquis of Salisbury wrote, on the subject of picketing, that he concurred with the Association "in thinking that picketing as at present practised appears to be open to considerable objection in many cases where it appears to involve molestation and intimidation. This interpretation of the present law is certainly not in accordance with the views of those by whom the Bill was framed." Mr. H. H. Asquith, M.P., dealing with the same question, wrote that, while recognising the importance of the subject, he did not feel it his duty at present to express any opinion upon it. Mr. Herbert Gladstone, M.P., wrote that he was not aware that an alteration of the law in regard to picketing was necessary. A letter was also received from Mr. George Livesey, who enclosed a cheque for 20*l.* towards the work of the Association.

The report stated that the Association was now in a position to look back with considerable satisfaction on the labours of the past twelve months. During that period the necessity for the existence of such an Association was again demon-

strated, because on five occasions a deliberate attempt was made by certain sections of the Labour party to crush out of existence, or to starve into submission, those bodies of workmen who had hitherto preferred to remain outside of the movement known as the New Trade Unionism. They believed that the conflict between capital and labour had by no means reached its climax yet; but if masters would only act unitedly, and stand by one another, as the Federated Trade Union were now doing, and, above all, if they would support and protect from injury those of their *employees* who were totally at variance with the present policy of the New Trade Unionism, they felt certain that the party which depended for its force upon intimidation, class hatred, and violence would receive a complete overthrow, for the great bulk of the working classes were completely sick of the meddlesomeness and tyranny which characterised the Trade Union officials at the present day. As to the Employers' Liability Bill, it seemed strange that the Association was alone in putting before the working classes the deliberate injustice inflicted upon working-men by the insertion of the clause forbidding "contracting out." The Association had held meetings and passed resolutions against the action of the Building Trades Federation, and in two months 5,764 bricklayers, carpenters, plasterers, masons, and labourers had been registered. No doubt a great blow had been struck at the organisation, which had done incalculable harm to the building trade of London. There were 16,822,165 persons employed in working for their living, and of those 9,786,073 were men over twenty years of age. Of these 1,109,014 were members of trade unions, and 8,677,059 were free labour men and non-unionists. At the end of August 228,000 seamen had been registered as free labourers. In the Metropolitan Docks the demand for tickets as free labourers had been so great that it had been necessary to limit the issue to the men for whom employment could be found. The numerical strength of the unions had decreased, in spite of the great efforts and confidence in the management of the agitators and self-seekers. During the past twelve months the number of workmen registered by the Association amounted to 11,540, thus bringing up the present membership to the very respectable total of 51,249. In reference to the suggested action of the London County Council in refusing to employ non-union men, the report stated that the Works Department admitted the truth of three cases presented by the deputation of the Free Labour Association, but denied the correctness of the other three; but since then a letter had appeared in an evening paper from one of the foremen in question, who acknowledged that he was in the habit of communicating with the various unions before giving applicants employment. This admission proved that the Works Department could not have made a very searching investigation into the cases brought before them, or a complete contradiction from one of their *employees* would not have followed so quickly upon their statement.

The Chairman said they were formed to counteract the tyranny of the new unionism. They did not object to combination in a legitimate form, nor was the Association formed to lower wages. They believed the best men would always command the highest wage, and the best men in the trades were in their ranks. They found that their manufacturing supremacy was leaving them slowly, and as thinking men they looked for the cause. In this connexion he referred to the large amount of ironwork that was being carried out by German and Belgian firms for English capitalists and with English money. He believed that nine out of ten strikes were needless, and if those who said they were the leaders of the working men had approached the masters in a right spirit the consequent misery might have been averted. That Association was the outcome of the struggle with the new unionism, and only those who had stood face to face with the tyranny exercised by that unionism could state what a real tyranny it was. The vexatious interference at the docks of those who knew nothing of the relations between masters and men was bound to result in most disastrous consequences to the country. The members of the Congress were working men who had left their work to attend; but of those attending the recent Norwich Conference, 25 per cent. had not worked at their trade for over fifteen years, and 75 per cent. had not worked at their trade for some considerable time; the only real workers were the miners. They must protest against England being made the "dumping-



ground" for starving aliens. Could they not do something to re-establish the friendly relations which formerly existed between capital and labour? Surely there was not such an impassable chasm? If they did not bridge that chasm over the trade of the country would dwindle away. He believed they could do something towards that, and set an example which would be an example to the world, and which the world would profit by.

Mr. C. Godden moved the following resolution:—"That in the opinion of this Congress the senseless and abortive strikes which have occurred in many branches of industry throughout the country, have had a most disastrous effect upon the living standard of the wage-earning classes, and are mainly the cause of the present stagnation of trade and consequent want of employment." He said he had been a victim of the coercive tyranny of trades unionism for the last four years, and that during that time he had been persistently persecuted and boycotted by the union representing the painting trade. He was prevented from doing work for Captain Boyton, at Earl's Court, and was threatened outside Lillie Bridge Ground. He went in to work there, but 1,500 men threatened to strike, and after working a day and a-half he was forced to come out, and at the time he was absolutely starving.

Mr. G. W. Clasper (Newcastle) seconded the resolution. He said that if trades unionism was not checked, much of the trade of the North of England would be lost. During nine months 3,000 workmen in Newcastle had joined the National Free Labour Association.

After a brief discussion, during which the evils of strikes were referred to, the resolution was adopted.

Mr. Beale (Finchley) next moved:—"That, in the opinion of this Congress, no alteration in the 'Conspiracy and Protection of Property Act, 1875,' will be satisfactory which does not so provide that, while recognising the legal right of workmen to picket during strikes for the *bona fide* purpose of giving and receiving information, picketing in such numbers as must inevitably terrorise those who may be willing to work should be prohibited."

This was seconded by Mr. Ritson, of Hall, and passed, after discussion; after which the Congress adjourned for the day.

The second meeting of the Congress was held on Wednesday, Mr. John Chandler, President, again occupying the chair.

The Chairman, in opening the evening's proceedings, said that there could be no question that these meetings promised to lead to still greater things. Those who represented that Association did not despise the day of small things, but they did not intend to rest where they were. The Association commenced with a few men who combined to resist the tyrannical pressure that was put upon them; and he felt quite sure that the seed they had sown would continue to grow larger and larger, until at last it came to be a mighty oak that would overshadow all the mushroom unions which had lately sprung up, and had done so much harm to the cause of labour. The Association was going largely to extend the scope of its operations by establishing branches throughout the whole country. A great deal of tyranny had been exercised over the working-classes for some time past. The Free Labour Association had broken it down already to a large extent, and would yet break it down altogether.

Mr. Ellis, of the London and North-Western Railway Works, who said he did not represent railway workmen as a delegate, but appeared in the interests of labour generally, moved:—"That this meeting, representing the vast majority of the working classes in the United Kingdom, enters a most emphatic protest against the reintroduction of an Employers' Liability Bill containing a clause forbidding 'contracting out,' and calls upon all workmen by their individual influence to support the House of Lords in throwing out a measure which deprives working men of their undoubted right to make better terms as to insurance against accident than the law now permits them to do, and one also which forces a workman to the expense of a doubtful and expensive lawsuit in order to obtain a smaller sum than would be awarded to him free of expense by his Mutual Insurance Society."

Mr. Foreman, of the Elswick Works, Secretary of the Association's Fund, in seconding the resolution, said the working men of Durham were fighting against the Eight Hours Bill just as they were fighting against interference with freedom of contract and action under the Employers' Liability Bill. With regard to the mutual

insurance associations, he maintained that arrangements between employers and workmen were the best means, not only of securing compensation, but of minimising accidents.

Mr. Burrows, of the South Metropolitan Gas Company and Mutual Assurance and Compensation Fund, and Mr. Bashford, Honorary Secretary to the Mutual Assurance Committee of the London, Brighton, and South Coast Railway, also supported the resolution, which was carried unanimously.

Mr. Ritson, of the Free Labour Association at Hull, representing 11,000 free labourers there, moved, "That this Congress rejoices to learn that the free labour principles are making steady and certain progress amongst the industrial classes of the country, who recognise the necessity for the permanent maintenance of a free labour party so as to resist the ever encroaching tyranny and dictation of the Socialistic Trade Unions, and, further, that the Congress would welcome with pleasure any means tending to the establishment of more cordial relations between employers and employed, believing that it is not only for the best interests of both alike, but for the welfare of the trade and commerce of this country, that mutual confidence should exist between the two parties."

In support of his resolution, Mr. Ritson said the supporters of this labour movement might be ostracised for adherence to free-labour principles, might be called by insulting names, and be talked about as men not worthy to represent the working classes of the country, but their vindication for the stand they were now making against the organised tyranny of the day might be safely left to those who followed them in the future.

The resolution, seconded and supported by Mr. Russell, of Glasgow, and Mr. Macauliffe, of Dublin, was carried.

Mr. Harold Stevenage, of London, moved:—"That in the opinion of this Congress the time has arrived when it is absolutely necessary that some restriction should be placed upon the immigration of pauper aliens to this country, and it is pleased to note that the Trade Union Congress has at last accepted the views that this Association has so long advocated in the matter; and further, that this Congress earnestly hopes the Bill restricting pauper immigration, recently introduced in the House of Lords, shall be allowed to become law, and desires that a copy of this resolution be forwarded to the leaders of both political parties."

The resolution was seconded by Mr. Woolcock, of London, supported by Mr. Henry J. Guerrier, of London, and carried.

The Congress soon after terminated.

#### THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

**New Entrance to Brockwell Park.** The Parks Committee proposed to expend 5,715*l.* for the purchase of a plot of land for the purpose of forming an additional entrance to Brockwell Park, on condition that the Lambeth Vestry entered into an agreement to contribute one-third of the total cost. An amendment to refer the matter back for further consideration having been defeated, the recommendation was agreed to.

**Bishop's Park, Fulham.**—The same committee also recommended the Council to contribute a sum of 7,500*l.* towards the completion of the scheme for the formation of Bishop's Park, Fulham, such cost being three-fourths of the estimated cost of acquiring and adding to the Bishop's-meadow the adjoining properties known as Pryor's Bank and Thames Bank, and of laying out the same, continuing the river-wall along the front, and forming an access from Putney Bridge, the vestry undertaking to the satisfaction of the Solicitor to maintain the ground as an open space in perpetuity. This recommendation was also agreed to.

**Clerkenwell Fire Station and the Works Committee.**—The Fire Brigade Committee recommended that the work of enlarging and altering the Clerkenwell fire station at an estimated cost of 6,750*l.* be executed by the Council without the intervention of a contractor, and that the plans, specification, and estimate be referred to the Works Committee for that purpose.

Alderman Beachcroft pointed out that the Architect's original estimate was only 5,500*l.* In view of that fact he thought they should seriously consider whether tenders should not be invited for the work, and he therefore moved that the report be referred back with that object. He was

not opposed to the Works Department, but he saw no reason why contracts should not be invited, and why the Works Department should not tender in the ordinary way.

Mr. Ward, Chairman of the Works Committee, pointed out that the Committee would be placed at a great disadvantage if the Council placed them in the position of contractors. The ordinary contractor, if he failed to get a tender in one place, could go to another, but not so the Works Committee, and what, he asked, were they to do with all their men and machinery when, for reason of not being the lowest tenderer, they had no work to do.

Mr. J. Burns, M.P., strongly supported the Committee, and in the end their report was carried.

**Cost of Work.**—The Works Committee submitted a detailed return of the cost of the first thirty-two works carried out by the Committee without the intervention of a contractor. The total estimated cost of the whole of these works was 66,061*l.*, and the actual cost was less than that amount by over 3,000*l.*

Mr. Westcott criticised the report, and moved an amendment that it be received with the exception of the paragraph giving the figures of estimated and actual cost. He said where the Committee did work underground they were able to save money on the estimate, but where the work was above ground the reverse was the case.

Alderman Hoare thought it was too early to say whether this new departure was a success or not, and expressed the hope that powers would be given to the Committee to tender for the work of the Vestries and other local bodies in London.

The debate was postponed.

**Deficient Water Supply.**—The first paragraph of the Public Control Committee was as follows, the recommendation being agreed to:—

"On July 2 last we reported to the Council as to petitions and complaints received on the subject of the inadequacy of the supply in the East London Water Company's district, and the question of obtaining legislation to raise the limit to which the company is required to give a supply to a greater height than 40 ft. was referred to the Water and Sanitary Committee. Since the date of that report we have received numerous complaints from local sanitary authorities and others that the company has been cutting off the supply in its district at night, and, in some parts of the district, at intervals during the day, thereby causing great inconvenience to the consumers and danger to their health, as well as seriously increasing the risk to life and property in the event of fire. We addressed a letter to the company with reference to these complaints, asking for an explanation of this failure to provide and keep a constant supply as required by Section 7 of the Metropolitan Water Act, 1871, and intimating that if the explanation was not satisfactory it would be the duty of the Council to consider as to taking proceedings for the enforcement of the penalties provided for by Section 16 of the Act. In reply to this letter the company sent a print of a circular which had been sent to each of the local authorities in the company's district attributing the temporary cessation of the constant service to the storage in the reservoirs having fallen far below the usual quantity, owing to deficient rainfall and the consequent non-repletion of the springs which had suffered from the drought of last year. The company also quoted an extract from the recently-issued report of General Scott, the Water Examiner to the Local Government Board, to the effect that the diminution of the flow of the River Lea had rendered it prudent to husband the company's visible supply of water. There was failure to maintain a constant supply in its district, and the contention of the company then was that the failure was due to frost. As the action of the East London Waterworks Company in laying on a constant supply had been voluntary, counsel was asked to advise whether in such a case a company was liable to a penalty for not continuing the supply. Counsel advised that Section 7 of the Metropolitan Water Act, 1871, imposed upon a company which had voluntarily proposed to give a constant supply and commenced to give it, the obligation to continue to give it, and that Section 16 applied equally to a company which had voluntarily undertaken to give a constant supply as to a company which had been required to do so. The Council thereupon addressed a letter to the East London Water Company in July, 1891, stating that in the event of any future failure to maintain a constant supply in that portion of the company's district within the county of London, it would be incumbent on the Council to take proceedings. Having regard to the warning, to the repeated complaints which have since been received, to the fact that drought non-pleaded as the company's excuse was urged in its defence last year when proceedings were taken against it by the Industrial Dwellings Company, and to the serious danger to the health of the community which must result from a deficient supply of water in a crowded district, we are



opinion that the time has arrived when the Council would take action for the enforcement of penalties. We recommend—

"That the Soli fir be instructed to take proceedings against the East London Waterworks Company for failure to maintain in its district a constant supply as required by the provisions of the Metropolitan Water Act, 1871."

**Surviving Sources of Water Supply.**—The Water Committee brought up the following report:—

"In view of the inquiries which we are now making as to available sources of water supply for London, it is essential that we should have reliable information respecting certain large reservoirs in connexion with a scheme now being considered. This information can only be obtained by having proper surveys of the reservoirs made, and the chief engineer estimates that the cost of so doing will be about 450*l.*, which includes 200*l.* for one year's salary of the person to be employed, and 250*l.* for necessary expenses. We have satisfied ourselves that this is a reasonable amount, and we have decided to advise the Council to sanction the expenditure. We recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, authority be given to us to have surveys made of certain large reservoirs, the cost of such surveys not to exceed 450*l.*"

Mr. Antrobus asked if the inquiry was in reference to a direct supply from Wales.

Mr. Bassett Hopkins said that it would not be the public interest that he should add anything to the recommendation.

Mr. J. Howell Williams asked whether the Committee had considered the possibility of co-operating with Birmingham in securing a water supply for London.

Mr. Bassett Hopkins said that point had mainly not escaped the attention of the Committee.

The recommendation was agreed to.

**London Building Act, 1894.**—The report of the Building Act Committee contained the following paragraph, the recommendation being agreed to:—

"We are of opinion that it would be of advantage to the Council and the public if the London Building Act, 1894, together with the regulations of the Council as to applications for sanction or consent under the Act, and the by-laws now in force, were to be printed and issued in book-form. This, for which we anticipate there would be a great demand on the part of the public, would form a complete code with reference to the control of building operations in London. We are advised that the cost of 100 copies would not exceed 75*l.*, and we think it could be placed on sale at the price of 2*s.* 6*d.* each. We accordingly recommended—

"That, subject to an estimate being submitted by the Finance Committee as required by the statute, the London Building Act, 1894, with the Council's regulations as to applications for sanction or consent under the Act, and the by-laws now in force, be printed at a net not exceeding 75*l.* for 1,000 copies, and be placed on sale at the price of half-a-crown each copy."

We have given instructions for an advertisement to be issued calling attention to the fact that the London Building Act will come into force on the 1st of January next; and should the Council adopt the above recommendation, an intimation will be given to the advertisement that copies of the Act, with the laws and regulations, will be obtainable of Mr. Stanford."

**Tower Bridge Southern Approach.**—The Parliamentary and Improvements Committee jointly reported on the subject of the Tower Bridge (Southern Approach) Bill. They recommended: (1) That the line of route previously decided upon by the Council for the southern approach to the Tower Bridge be adhered to. (2) That the Bill be re-introduced in the next Session in the form which it was passed by the House of Commons I sent up to the House of Lords in June, 1894." Mr. Howell Williams moved that the recommendation be referred back to allow of a fuller inquiry into alternative routes.

Mr. Payne seconded the amendment.

Mr. Arter said the Improvements Committee regarded the Tower Bridge as the London edge of the future, and had arranged the route accordingly.

On a division, and by 48 votes to 36, the rate was adjourned.

The Council adjourned soon after 7 o'clock.

**ASHER'S PATENT CHIMNEY-TOP.**—There is no error between the principle of this and many other up-draught cowl; there is a variation in all in the fact that the induced current is led up a spiral passage around the chimney-top or pipe. The result, the patentees can expect from this, is to increase friction and thereby weaken the current of air, we cannot see. Some of our readers, however, may like to experiment with it.

## Correspondence.

To the Editor of THE BUILDER.

### SCREENING OF HEATED FLUES.

SIR,—“Fireproof,” in your penultimate issue, asks for suggestions for preventing excess of heat of a flue from penetrating the half-brickwork with which its inner side is enclosed. But he does not give particulars sufficient to ensure a ready reply. How high is the flue and what is the size of the fire or furnace? Is the fire close or open?

Slabs of combined slag-wool and plaster, the slag-wool held together on the unplastered side by wire-netting, might be applied. The slag-wool side of these non-conducting slabs to be placed next the brickwork, and the outside, plaster sides, of the slabs afterwards jointed and set with plaster.

I got over a similar difficulty in a public institution, where the flue, 14 in. by 9 in., and 70 ft. high (passing through several wood floors) was from the close furnace of a small cylindrical bath boiler. The

flue was on all sides formed of 9-in. brickwork, and carried up in one stack together with the ordinary flues of the open fireplaces of the rooms, one side being flush with the inner faces of the room-walls and plastered over in the same plane. The heat which came through was quite alarming. To have applied the slag-wool remedy, suggested above, would have involved retrimming all the floors and ceilings, and would have resulted also in an unsightly projection and the alteration of a flight of stairs, to say nothing of the inconvenience and expense. Consequently another and simpler remedy was devised. A 9 in. by 9 in. air-inlet grating was inserted in the basement portion of the flue above the damper, and about 2 ft. below the ceiling, which was a fireproof one. This cooled the air and gases in the flue without injuriously affecting its draught, and had the further beneficial effect of preventing the attendants mistaking the furnace by improperly forcing the fire by means of the abuse of the damper.

The cure is quite effectual and satisfactory, but if it be applied to a chimney which is too short, such a method might unduly check the draught. At any rate, the experiment could be carried out at a trifling cost, and the size of the inlet modified to such size as would give the best result. I imagine “Fireproof’s” chimney is not so very short, or the heat would not trouble him.

A. HARSTON.

### ACTION OF WATER ON GALVANISED IRON.

SIR,—I desire to draw the attention of your readers to the following, and should be glad to get the advice of any who may have had similar experience.

About two years ago I fixed a system of hot and cold water to a bath, the supply-cistern and hot-water tank being of stout galvanised iron. The water is heavily charged with hardening matter, and has eaten the tanks in several places, allowing the water to percolate through, more especially in the hot-water tank. The information I seek is—1. What is the destructive agent? 2. What is my remedy?

G. H.

“Without a chemical analysis of the water concerned it would not be easy to answer the question to any purpose. Our correspondent writes from Leabury, possibly some reader may know something of the character of the water supply in that neighbourhood.”—ED.

### WATER LODGING ON MEETING-RAILS.

SIR,—Replying to “T.”’s letter in last week’s *Builder* re above, we would beg to point out that in May, 1893, we patented a condensation sill for the prevention of the collection of condensation water (sketch enclosed).

“The sketch section of Messrs. Williams Bros & Co. sash-rail seems calculated to answer the purpose much better than the suggestion made by ‘T.’”—ED.

**A TURKISH SCHOOL OF ARCHITECTURE.**—We learn that a professor of mathematics at the Mulkid School at Stamboul has asked the Turkish Imperial Government to authorise the establishment of a school of architecture.

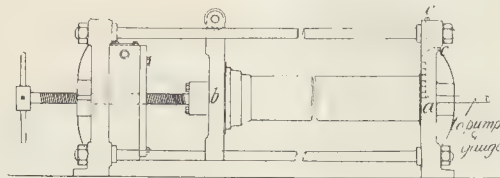
## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XVIII.

PLATE (continued).

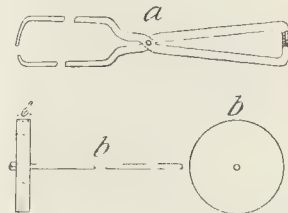
**II**E pipes, after being cleaned, are struck all round with a light hammer, and, if sound, are placed in the testing machine (fig. 48) and tested by oil or water; the former is perhaps better for the iron-work, but is more costly, and the benefit derived therefrom small. Gaskets or steel rings wrapped with yarn are hung at each end of the pipe, to form a joint with the iron plates, one of which (a) is fixed, and the other (b) movable, the latter being driven forward by a screw and gearing worked by hand. The screw-plate has an air-pipe (c) cast in it, through which the air escapes, as the water, flowing in, fills the pipe under test. When the water flows full-bore

Fig 48



through the air-pipe, showing that the air has escaped, the valve is closed and the screw-plate tightened up, the pump having been started just before. The pressure-gauge, which should be placed in a conspicuous position, records the rise of pressure. Attention must be given during the whole of the testing operation to the behaviour of the pipe. When the testing limit is reached, a valve between the pump and the testing-machine is closed, shutting off the connexion with the pump and allowing the pipe to remain under the specified pressure while it is examined and struck with a hammer. During this period the gauge should remain stationary, unless there is a loss from leakage, which must at once be stopped and the test restarted. After being tested for pressure, the pipe is tested for thickness and uniformity of metal by means of calipers and a disc (fig. 49).

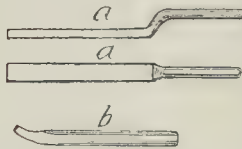
Fig 49



The examination being satisfactory, the pipe is conveyed to a heating-stove and raised to a temperature of 400 deg. Fahr., previous to dipping it in what is termed Dr. Angus Smith's composition, consisting of pitch, asphalt, resin, and linseed oil at a temperature of 300 deg. Fahr. The pipe is then ready for delivery on the site of the works. The pipes are lowered into the trench prepared for them, either by hand by means of ropes, or by a block-and-tackle arrangement attached to tripod legs. The trench is sufficiently enlarged at the junctions of the pipes so as to admit of the jointing material being properly filled, caulked, and examined. Each pipe is struck with a hammer for soundness, and the spigot end carefully driven up into the socket of the preceding pipe, after which it is ranged in line and set at the required level, attention being paid to the even thickness of the joint. The lead joint is made by driving a gasket of strip lead or a few coils of yarn into the space between the spigot and the socket by means of a yarning-iron (fig. 50a). The former method is coming into general use, and is preferable on sanitary grounds, as the yarn becomes a nest for bacteria. The gasket having been slightly driven up to the back of the socket, the joint is ready for the clay luting, which is placed around the lead space at the face of the socket, with a lip at the top to

receive the molten lead. Care must be taken to remove the dross before running the molten lead, which must in all cases be done in one operation, so as to ensure a solid joint throughout. The lead having become solidified, the clay luting is

Fig 50



removed, the surplus lead at the lip cut off, and the joint set up at least  $\frac{1}{8}$  in. within the socket by means of caulking-tools (fig. 50b). After each joint is completed the pipe should be examined inside to see if any lead has run through from careless yarning, so that it may be removed.

The joints of turned and bored pipes are made by painting the machined portion with thin red lead or liquid Portland cement. The spigot is then placed within the socket and driven up with a wooden maul. The labour entailed in laying this class of pipes is small, and the general experience where they have been adopted is that they are quite equal to lead joints except for turning curves, where the lead joint may be utilised as well as for expansion purposes already referred to.

Wrought-iron or steel pipes are largely used in the smaller sizes for connecting services in the place of lead pipes where the water is of such a nature as to attack the lead and produce lead-poisoning. The pipes consist of strips of metal either welded or solid drawn, with screwed socket-joints; they are usually galvanised, and can be manufactured to suit any pressure required. Wrought-iron tubes are made in lengths usually not exceeding 14 ft., but can be obtained up to 20 ft. in length if necessary. They are made in three qualities—gas, water, and steam—the steam-tubes being two gauges, and the water-tubes one gauge thicker than the gas-tubes.

The following table gives the results of Messrs. J. Russell's experiments with wrought-iron solid drawn tubes, according to Mr. D. K. Clarke:—

External Diameter.	Thickness.	Internal Diameter.	Bursting Pressure.		Collapsing Pressure.		Per sq. in. of Surface.	Per sq. in. of Section of Metal.	Per sq. in. of Surface.	Per sq. in. of Section of Metal.
			lbs.	tons.	lbs.	tons.	lbs.	tons.	lbs.	tons.
10	1/16	9 1/2	400	2 1/2	17 1/2	1 1/4	400	2 1/2	17 1/2	1 1/4
11	1/8	10 1/2	450	2 3/4	19 1/2	1 1/4	450	2 3/4	19 1/2	1 1/4
12	1/8	11 1/2	500	3 1/4	21 1/2	1 1/4	500	3 1/4	21 1/2	1 1/4
13	1/8	12 1/2	550	3 1/2	23 1/2	1 1/4	550	3 1/2	23 1/2	1 1/4
14	1/8	13 1/2	600	3 3/4	25 1/2	1 1/4	600	3 3/4	25 1/2	1 1/4
15	1/8	14 1/2	650	4 1/4	27 1/2	1 1/4	650	4 1/4	27 1/2	1 1/4
16	1/8	15 1/2	700	4 1/2	29 1/2	1 1/4	700	4 1/2	29 1/2	1 1/4
17	1/8	16 1/2	750	4 3/4	31 1/2	1 1/4	750	4 3/4	31 1/2	1 1/4
18	1/8	17 1/2	800	5 1/4	33 1/2	1 1/4	800	5 1/4	33 1/2	1 1/4
19	1/8	18 1/2	850	5 1/2	35 1/2	1 1/4	850	5 1/2	35 1/2	1 1/4
20	1/8	19 1/2	900	5 3/4	37 1/2	1 1/4	900	5 3/4	37 1/2	1 1/4
21	1/8	20 1/2	950	5 3/4	39 1/2	1 1/4	950	5 3/4	39 1/2	1 1/4
22	1/8	21 1/2	1000	6 1/4	41 1/2	1 1/4	1000	6 1/4	41 1/2	1 1/4
23	1/8	22 1/2	1050	6 1/2	43 1/2	1 1/4	1050	6 1/2	43 1/2	1 1/4
24	1/8	23 1/2	1100	6 3/4	45 1/2	1 1/4	1100	6 3/4	45 1/2	1 1/4
25	1/8	24 1/2	1150	6 3/4	47 1/2	1 1/4	1150	6 3/4	47 1/2	1 1/4
26	1/8	25 1/2	1200	7 1/4	49 1/2	1 1/4	1200	7 1/4	49 1/2	1 1/4
27	1/8	26 1/2	1250	7 1/2	51 1/2	1 1/4	1250	7 1/2	51 1/2	1 1/4
28	1/8	27 1/2	1300	7 3/4	53 1/2	1 1/4	1300	7 3/4	53 1/2	1 1/4
29	1/8	28 1/2	1350	7 3/4	55 1/2	1 1/4	1350	7 3/4	55 1/2	1 1/4
30	1/8	29 1/2	1400	8 1/4	57 1/2	1 1/4	1400	8 1/4	57 1/2	1 1/4
31	1/8	30 1/2	1450	8 1/2	59 1/2	1 1/4	1450	8 1/2	59 1/2	1 1/4
32	1/8	31 1/2	1500	8 1/2	61 1/2	1 1/4	1500	8 1/2	61 1/2	1 1/4
33	1/8	32 1/2	1550	9 1/4	63 1/2	1 1/4	1550	9 1/4	63 1/2	1 1/4
34	1/8	33 1/2	1600	9 1/2	65 1/2	1 1/4	1600	9 1/2	65 1/2	1 1/4
35	1/8	34 1/2	1650	9 1/2	67 1/2	1 1/4	1650	9 1/2	67 1/2	1 1/4
36	1/8	35 1/2	1700	10 1/4	69 1/2	1 1/4	1700	10 1/4	69 1/2	1 1/4
37	1/8	36 1/2	1750	10 1/2	71 1/2	1 1/4	1750	10 1/2	71 1/2	1 1/4
38	1/8	37 1/2	1800	10 1/2	73 1/2	1 1/4	1800	10 1/2	73 1/2	1 1/4
39	1/8	38 1/2	1850	11 1/4	75 1/2	1 1/4	1850	11 1/4	75 1/2	1 1/4
40	1/8	39 1/2	1900	11 1/2	77 1/2	1 1/4	1900	11 1/2	77 1/2	1 1/4
41	1/8	40 1/2	1950	11 1/2	79 1/2	1 1/4	1950	11 1/2	79 1/2	1 1/4
42	1/8	41 1/2	2000	12 1/4	81 1/2	1 1/4	2000	12 1/4	81 1/2	1 1/4
43	1/8	42 1/2	2050	12 1/2	83 1/2	1 1/4	2050	12 1/2	83 1/2	1 1/4
44	1/8	43 1/2	2100	12 1/2	85 1/2	1 1/4	2100	12 1/2	85 1/2	1 1/4
45	1/8	44 1/2	2150	13 1/4	87 1/2	1 1/4	2150	13 1/4	87 1/2	1 1/4
46	1/8	45 1/2	2200	13 1/2	89 1/2	1 1/4	2200	13 1/2	89 1/2	1 1/4
47	1/8	46 1/2	2250	13 1/2	91 1/2	1 1/4	2250	13 1/2	91 1/2	1 1/4
48	1/8	47 1/2	2300	14 1/4	93 1/2	1 1/4	2300	14 1/4	93 1/2	1 1/4
49	1/8	48 1/2	2350	14 1/2	95 1/2	1 1/4	2350	14 1/2	95 1/2	1 1/4
50	1/8	49 1/2	2400	14 1/2	97 1/2	1 1/4	2400	14 1/2	97 1/2	1 1/4
51	1/8	50 1/2	2450	15 1/4	99 1/2	1 1/4	2450	15 1/4	99 1/2	1 1/4
52	1/8	51 1/2	2500	15 1/2	101 1/2	1 1/4	2500	15 1/2	101 1/2	1 1/4
53	1/8	52 1/2	2550	15 1/2	103 1/2	1 1/4	2550	15 1/2	103 1/2	1 1/4
54	1/8	53 1/2	2600	16 1/4	105 1/2	1 1/4	2600	16 1/4	105 1/2	1 1/4
55	1/8	54 1/2	2650	16 1/2	107 1/2	1 1/4	2650	16 1/2	107 1/2	1 1/4
56	1/8	55 1/2	2700	16 1/2	109 1/2	1 1/4	2700	16 1/2	109 1/2	1 1/4
57	1/8	56 1/2	2750	17 1/4	111 1/2	1 1/4	2750	17 1/4	111 1/2	1 1/4
58	1/8	57 1/2	2800	17 1/2	113 1/2	1 1/4	2800	17 1/2	113 1/2	1 1/4
59	1/8	58 1/2	2850	17 1/2	115 1/2	1 1/4	2850	17 1/2	115 1/2	1 1/4
60	1/8	59 1/2	2900	18 1/4	117 1/2	1 1/4	2900	18 1/4	117 1/2	1 1/4
61	1/8	60 1/2	2950	18 1/2	119 1/2	1 1/4	2950	18 1/2	119 1/2	1 1/4
62	1/8	61 1/2	3000	18 1/2	121 1/2	1 1/4	3000	18 1/2	121 1/2	1 1/4
63	1/8	62 1/2	3050	19 1/4	123 1/2	1 1/4	3050	19 1/4	123 1/2	1 1/4
64	1/8	63 1/2	3100	19 1/2	125 1/2	1 1/4	3100	19 1/2	125 1/2	1 1/4
65	1/8	64 1/2	3150	19 1/2	127 1/2	1 1/4	3150	19 1/2	127 1/2	1 1/4
66	1/8	65 1/2	3200	20 1/4	129 1/2	1 1/4	3200	20 1/4	129 1/2	1 1/4
67	1/8	66 1/2	3250	20 1/2	131 1/2	1 1/4	3250	20 1/2	131 1/2	1 1/4
68	1/8	67 1/2	3300	20 1/2	133 1/2	1 1/4	3300	20 1/2	133 1/2	1 1/4
69	1/8	68 1/2	3350	21 1/4	135 1/2	1 1/4	3350	21 1/4	135 1/2	1 1/4
70	1/8	69 1/2	3400	21 1/2	137 1/2	1 1/4	3400	21 1/2	137 1/2	1 1/4
71	1/8	70 1/2	3450	21 1/2	139 1/2	1 1/4	3450	21 1/2	139 1/2	1 1/4
72	1/8	71 1/2	3500	22 1/4	141 1/2	1 1/4	3500	22 1/4	141 1/2	1 1/4
73	1/8	72 1/2	3550	22 1/2	143 1/2	1 1/4	3550	22 1/2	143 1/2	1 1/4
74	1/8	73 1/2	3600	22 1/2	145 1/2	1 1/4	3600	22 1/2	145 1/2	1 1/4
75	1/8	74 1/2	3650	23 1/4	147 1/2	1 1/4	3650	23 1/4	147 1/2	1 1/4
76	1/8	75 1/2	3700	23 1/2	149 1/2	1 1/4	3700	23 1/2	149 1/2	1 1/4
77	1/8	76 1/2	3750	23 1/2	151 1/2	1 1/4	3750	23 1/2	151 1/2	1 1/4
78	1/8	77 1/2	3800	24 1/4	153 1/2	1 1/4	3800	24 1/4	153 1/2	1 1/4
79	1/8	78 1/2	3850	24 1/2	155 1/2	1 1/4	3850	24 1/2	155 1/2	1 1/4
80	1/8	79 1/2	3900	24 1/2	157 1/2	1 1/4	3900	24 1/2	157 1/2	1 1/4
81	1/8	80 1/2	3950	25 1/4	159 1/2	1 1/4	3950	25 1/4	159 1/2	1 1/4
82	1/8	81 1/2	4000	25 1/2	161 1/2	1 1/4	4000	25 1/2	161 1/2	1 1/4
83	1/8	82 1/2	4050	25 1/2	163 1/2	1 1/4	4050	25 1/2	163 1/2	1 1/4
84	1/8	83 1/2	4100	26 1/4	165 1/2	1 1/4	4100	26 1/4	165 1/2	1 1/4
85	1/8	84 1/2	4150	26 1/2	167 1/2	1 1/4	4150	26 1/2	167 1/2	1 1/4
86	1/8	85 1/2	4200	26 1/2	169 1/2	1 1/4	4200	26 1/2	169 1/2	1 1/4
87	1/8	86 1/2	4250	27 1/4	171 1/2	1 1/4	4250	27 1/4	171 1/2	1 1/4
88	1/8	87 1/2	4300	27 1/2	173 1/2	1 1/4	4300	27 1/2	173 1/2	1 1/4
89	1/8	88 1/2	4350	27 1/2	175 1/2	1 1/4	4350	27 1/2	175 1/2	1 1/4
90	1/8	89 1/2	4400	28 1/4	177 1/2	1 1/4	4400	28 1/4	177 1/2	1 1/4
91	1/8	90 1/2	4450	28 1/2	179 1/2	1 1/4	4450	28 1/2	179 1/2	1 1/4
92	1/8	91 1/2	4500	28 1/2	181 1/2	1 1/4	4500	28 1/2	181 1/2	1 1/4
93	1/8	92 1/2	4550	29 1/4	183 1/2	1 1/4	4550	29 1/4	183 1/2	1 1/4
94	1/8	93 1/2	4600	29 1/2	185 1/2	1 1/4	4600	29 1/2	185 1/2	1 1/4
95	1/8	94 1/2	4650	29 1/2	187 1/2	1 1/4	4650	29 1/2	187 1/2	1 1/4
96	1/8	95 1/2	4700	30 1/4	189 1/2	1 1/4	4700	30 1/4	189 1/2	1 1/4
97	1/8	96 1/2	4750	30 1/2	191 1/2	1 1/4	4750	30 1/2	191 1/2	1 1/4
98	1/8	97 1/2	4800	30 1/2	193 1/2	1 1/4	4800	30 1/2	193 1/2	1 1/4
99	1/8	98 1/2	4850	31 1/4	195 1/2	1 1/4	4850	31 1/4	195 1/2	1 1/4
100	1/8	99 1/2	4900	31 1/2	197 1/2	1 1/4	4900	31 1/2	197 1/2	1 1/4

The greater tensile strength of wrought-iron and steel, and their lightness compared with cast-iron, give them great advantages over the last metal in such cases where weight and strength are the main objects, although for cheapness and convenience in casting, as well as the greater thickness for corrosion, it is doubtful whether wrought-iron or steel will replace cast-iron in the manufacture of pipes. The action of the Bradford Corporation in adopting them in their new works may lead to their more general use for large mains, in somewhat inaccessible districts where the question of weight is a serious one.

Lead pipes are of almost universal application for service connexions and interior fittings on account of the facility with which they can be bent to suit the irregularities of structure, and it is a matter of importance that they should be of good quality and of sufficient strength for the purpose. The following table gives the sizes of pipes usually specified for service connexions:—

1/2 in. diameter	6 lbs. per yard.
1/2	9
3/4	12
1	16

Any of these pipes would stand a pressure of 500 ft. head of water. Several methods have been proposed for preventing the solvent action of some waters upon the lead, one of which is to line the interior of the pipe with black tin; but none of the many proposals have been largely adopted.

Clay pipes are frequently used for conveying water in collecting-drains and other situations where there is no head of pressure on the pipes. The joints are either left dry or filled with Portland cement as the circumstances require.

The following table of the dimensions of clay pipes was adopted by Mr. Baldwin Latham for the Bideford Waterworks:—

Internal Diam. in.	Stoneware.		Fireclay.		Other Clays Thickness.	Vulcan. Depth of Socket.
	Thickness.	Length in work.	Thickness.	Length in work.		
In.	In.	ft.	In.	ft.	in.	In.
2					2	
3	$\frac{1}{2}$	2	$\frac{1}{2}$	2	2	1
4	$\frac{3}{4}$	2	$\frac{3}{4}$	2	2	1
6	$\frac{3}{4}$	2	$\frac{3}{4}$	2	2	1
9	$\frac{3}{4}$	2	$\frac{3}{4}$	2	2	2
10	$\frac{3}{4}$	2	1	2		
12	$1\frac{1}{4}$	2	$1\frac{1}{4}$	2	1	2
15	$1\frac{1}{2}$	2	$1\frac{1}{2}$	2	1	2
18	$1\frac{1}{2}$	2 to 3	$1\frac{1}{2}$	2 to 3	2.	2



9-in., and 170 yds. of 8-in. pipe delivered 317 gallons per minute, with 405 ft. head, only 50 per cent. of the theoretical discharge. The pipes were subjected to repeated scrapings by means of scrapers worked through their entire length, the result of which was that the experimental discharge was brought up to the theoretical.

On account of corrosion, wrought-iron tubes conveying water should always be galvanised. In designing systems of pipes it is always advisable to increase the calculated diameter so as to allow for corrosion.

The following memoranda will be useful to the student when calculating the weight of pipes:—

Wrought-iron....	1 cubic inch	0.278 lb.
Cast-iron.....	1 cubic foot	480 "
Steel.....	1 cubic inch	0.260 "
Lead.....	1 cubic foot	450 "
Gun-metal.....	1 cubic inch	0.283 "
".....	1 cubic foot	489.6 "
".....	1 cubic inch	0.412 "
".....	1 cubic foot	712 "
".....	1 cubic inch	0.304 "
".....	1 cubic foot	524 "

# OBITUARY.

MR. J. B. McCALLUM.—Mr. J. B. McCallum, Borough Engineer of Blackburn, died on the 30th ult. Three weeks ago he fell in the street, breaking his leg and dislocating his ankle, and blood poisoning and erysipelas subsequently set in. Mr. McCallum was formerly Borough Engineer at Stafford, and had held his Blackburn post for 12 years.

# GENERAL BUILDING NEWS.

MUSEUM AT NORWICH CASTLE.—On the 25th ult. the keep of Norwich Castle and the surrounding buildings were opened by the Duke and Duchess of York as the Museum of the City of Norwich. The floors of prison cells erected in the early years of the century have been gutted and converted into pavilions lit by glass roofs, the former corridors being utilized as connecting-links by means of which visitors will pass round the buildings in a circle. They all look inwards on the centre space, formerly occupied by the house of the prison Governor, and now laid down with grass and gravel. The keep is now treated with great care, the removal of the buildings, which had grown up within it having brought to light a great deal of Norman detail, which has been left as far as possible untouched. It has been intended that any repair absolutely necessary should tell its own tale. A double-ridged glazed roof has been placed on the lines of the former roof, which were clearly seen in the external walls. The substantial gallery has been carried round the interior at the level of the former principal floor, from which access is obtained to the fine old Norman doorway, and to the circular staircases in the north-east and south-west corners, which lead to the original wall-passages and to the parapet behind the battlements. From this parapet a fine view of the city is obtained. The architect for the work was Mr. E. Boardman, and the contractor Mr. G. E. Hawes.

CHURCH, BUCKFASTLEIGH, DEVONSHIRE.—The Bishop of Exeter dedicated the new church of St. Luke, Buckfastleigh, on the 12th ult. It is built of local limestone. The facings are of Hamill stone, and the windows are of leaded glass. The main entrance is at the west end of the north side, and is protected by a porch of red deal, the interior fittings being of the same material. At the opposite end of the same side is the entrance to the vestry. Underneath is made provision for a heating apparatus. On the opposite side has been left a space, which it is hoped, in time will be utilised as an organ-chamber. The dimensions of the church, which can accommodate 350 people, are 60 ft. in length, 40 ft. in width, and about 40 ft. in height. The space from floor to eaves is 23 ft. The chancel is 25 ft. by 20 ft. The new building was erected by Mr. Henry Stevens, of Asburton, Mr. C. G. S. Crook, of Totnes, being the architect. ST. PETER'S CHURCH, STARCROSS, DEVONSHIRE.—The Parish Church of St. Paul, Starcross, was re-opened on the 20th ult., after having been closed for the purposes of the renovation of the interior, re-seating, &c. The former high pews have been removed and new open benches of stained and varnished pitch-pine substituted, the interior being laid with black paving. At the western doorway an entrance lobby has been formed with pitch-pine framing, and swing doors, the upper portions being filled with tinted cathedral lead glazing. The roof timbers have been painted and varnished, and the plaster ceiling between them tinted and divided into panels with stencilled border. The organ and choir seats, formerly in the north-east gallery, but pitch-pine stalls are now provided for the clergy and choir westward of the chancel arch, the space occupied by the stalls being raised above the level of the nave floor, and laid with encaustic tiles. The organ has been rebuilt and considerably enlarged by Messrs. Hele & Co., and now stands in the south-east corner

of the nave in close proximity to the choir. A carved oak pulpit and lectern have been presented by members of the congregation, and are in course of preparation by Messrs. Hems & Sons. The whole of the works have been carried out from the designs and under the superintendence of Messrs. J. W. Rowell & Son, architects, of Newton Abbot.

BUILDING TRADE IN EDINBURGH.—The annual meeting of the Incorporation of Edinburgh Guildry was held on the 22nd ult. The Dean of Guild said during the past year there had been a considerable increase in the number of warrants granted for the erection of dwelling-houses, especially tenements. The number of first-class houses and villas authorised was seventy-two, and the number of tenement houses 753. Of the latter, 224 were houses of two rooms, 286 of three rooms, and the remainder had four rooms and upwards. At the same time it was to be regretted that no new housing was being provided for the poor and labouring classes. The promotion of the City Improvement scheme had brought this question to the front, and he hoped something practical might be accomplished during the coming year. The extension of the city was chiefly westward and north-westward, and was in some instances going beyond the municipal boundaries. This raised the question whether in the unification and adjustment of parish boundaries the city boundaries ought not to be extended so as to include, or nearly include, St. Cuthbert's parish.

RESTORATION OF MILBURN PARISH CHURCH, CUMBERLAND.—The Church of St. Cuthbert, Milburn, which during the past few months has been closed for structural alterations and restoration, was re-opened by the Bishop of the diocese on the 19th ult. The church is Gothic in style, and was in a very dilapidated condition. The contractors for the respective works were:—Joinery, Mr. J. Moor, Penrith; masonry, Mr. Hudson, Penrith; plumber, &c., Mr. J. Jackson, Penrith; and Messrs. Watson, were the architects.

CRUNDLE CHURCH, KENT.—The parish church of Crundale, near Wye, Kent, has been re-opened by the Bishop of Dover, after having been thoroughly repaired. The building consists of a wide nave with a north aisle and porch, chancel with a low square tower on its northern side. The foundation of the church is of remote antiquity, and there are some indications which lead to the belief that the hill on which it stands was fortified at some early period. The bulk of the walls are of Early Norman date, although the tower is of the thirteenth century, and the chancel from the middle of the fourteenth. A few windows are insertions of the fifteenth century, and the reredos and chancel rails, of oak, date from the commencement of the last century. Until recently the north aisle was partitioned off from the nave, and its western part, without a floor, was used as a store for coals. The pews were square, uncomfortable boxes, in wretched condition, while the plastered walls and ceilings were badly dilapidated. The roofs have been stripped, boarded, lined with felt, and the old tiles replaced without disturbing the lichens and moss growing upon them; the windows have been reglazed, the flooring renewed on a layer of concrete to exclude damp, and open benches of convenient form have been substituted for the old pews. The north porch, which was of thin modern brickwork, has been raised with flint and stone, and the east end, also of red brick, has been transformed into a church-like design, with a new traceried window and buttresses. The ivy has been allowed to grow over the tower, where it does service to cover various patchings of brickwork of the last century in date. There is a curious ancient leaded spire above the tower, which has been repaired. Many antiquarian discoveries were made during the progress of the repairs, among which the following may be noted. The old rood-loft staircase was found almost perfect, having only been loosely filled in at each end. There is no chancel-arch, but the division between nave and chancel was effected by a beam which proved to be that of the old rood-loft. It had been covered at a later date with texts, a few traces of which were visible below later casing. It has been strengthened and repaired, and the arms of Queen Anne which were above it have been preserved, but removed to the west end. A sedile, of fourteenth-century work, portions of which only were visible before the repairs, has been discovered, and a piscina has been found beyond it. Above the piscina a small lancet window at the extreme south-west end of the chancel has been met with and restored. The foundations of the old Norman chancel were revealed when the earth was cleared away from the walls, of greater thickness than the later chancel walls built upon them. A wide arch on the south side, built up, indicates that at some period before the existence of the fourteenth-century chancel, a transept-like building must have opened out from it, removed, however, at an early period. Part of the foundations of this curious structure were met with, but they could not be traced far, owing to the existence of graves. An interesting window on the north side of the chancel has been restored. It had lost its tracery, but the form was indicated by the shape of the label. Some artistic pieces of stained glass have been carefully preserved. Portions of the rood-screen were found beneath the flooring, and a single traceried head has been worked into a new lectern made by Messrs. Jones & Willis. The church has been well known on account of its con-

taining the fine incised alabaster slab to the memory of John Spratt, rector. It was doing duty as a paving stone in the chancel, but being much injured by traffic, it was determined to raise it for preservation. It proves to have been the covering slab of an altar tomb, for its edge is moulded. It has been laid on a base formed of old fragments met with in the north aisle. The old oak reredos has been cleaned, and also the communion-table. The works have been carried out by Mr. Wilson, builder, of Canterbury, under the superintendence of the architect, Mr. E. P. Loftus Brock, F.S.A., of London. The cost, including heating apparatus, lightning-conductor, and the recasting of one of the bells, has been under £1,400. No attempt has been made to interfere with the ancient appearance of the fabric, and the old masonry has neither been cleaned nor scraped.

CORN EXCHANGE, OXFORD.—On the 22nd ult. the Mayor of Oxford, Alderman Gray, laid the foundation-stone of the new Corn Exchange in George-street. Besides making provision for a Corn Exchange, the design for the building includes premises for the accommodation of the Volunteer Fire Brigade, as well as a range of shops fronting George-street. The Corn Exchange, 71 ft. long by 53 ft. wide, abuts on the Gloucester Green side of the site, but the main entrance is arranged from George-street. The entrance leads up a flight of steps into a vestibule, and thence into the Exchange. Other entrances are also provided from the Gloucester Green side. A gallery is carried all along the east side of the Exchange, with staircases at either end of it and a recess in the centre forming a bandstand. Lavatory accommodation, offices, heating-vaults, and store cellars are duly provided. The Fire Brigade station is placed in the east side of the site, adjoining St. George's Church, and running the full depth from George-street to Gloucester Green. The accommodation includes an engine-house, drillshed, watch-room, messenger's room, and workshops; also a hose-tower, about 60 ft. high. On the upper floor are arranged the club-rooms, committee-rooms, and stores. A dwelling-house is also provided for the resident fireman. The remaining portion of the George-street frontage is taken up by a range of four shops, with residences over. The buildings are being executed in red brick with freestone dressings. The architect for the work is Mr. H. W. Moore, and the contractor Mr. Thomas Axtell, both of Oxford.

CHURCH, LANDPORT, HAMPSHIRE.—On the 27th ult. the foundation-stone was laid of the new Church of St. Agatha, in Conway-street, Landport. Messrs. Light & Son are the builders, and the work is being carried out under the superintendence of the architect, Mr. J. Henry Ball, of Southsea. The portion of the church at present in course of erection includes the nave, south aisle, and side chapel. The foundation-stone was of white marble, and shows the arms of Winchester College below the words "To the greater Glory of God." It was carved by Mr. Hoare, of Southsea, from designs by the architect. The church is designed in the Romanesque style. The nave and side aisle will be finished with semicircular domed apses. The columns of the main arcade are of red polished granite, with Portland stone capitals and bases. Those on the right side of the entrance are already in position. The side chapel will form a complete church, accommodating about 250 persons. The total length of the edifice will be 124 ft., with a width of 69 ft. 6 in., the nave having a span of 40 ft. Upwards of 800 people will find seats in it.

BUILDING IN BRADFORD, 1894.—The number of building plans deposited with the Bradford Corporation during the municipal year just ended was 494, of which 288 were approved.

TOWER, ST. MICHAEL AND ALL ANGELS' CHURCH, HEYDOUR, SLEAFORD.—The Dean of Lincoln re-dedicated the tower of St. Michael and All Angels' Church at Heydour, near Sleaford, on the 23rd ult., after restoration at a cost of £500. The work was rendered necessary in consequence of the failure of the foundations, which entailed six months' labour to make the tower safe and restore it to its original condition. Mr. W. White, of London, was the architect.

PROPOSED INFECTIOUS HOSPITAL, EAST GRINSTEAD.—A Local Government Board inquiry was held last week at East Grinstead by Dr. Sweeting, one of the Inspectors to the Board, concerning an application by the Local Board of East Grinstead to borrow £3,500 for the purchase of four acres of land and building an isolation hospital on it. The Board's Surveyor, Mr. W. W. Gale, said the land was four acres in extent, and ranged from 400 ft. to 420 ft. above the sea-level. There were five houses within a quarter-mile radius, and fourteen houses, all private, within a half-mile radius. It was 1½ miles from the parish church, which was in the centre of the town. There was a good hard road the whole way to it. The soil was about 9 in. of loam, then 5 ft. or 6 ft. of clay overlying sand-rock. The hospital would be supplied with water by the East Grinstead Gas and Water Company. A railway cutting, 40 ft. deep, immediately adjoined the site, which was thereby naturally drained, and would not need under-draining. The prevailing winds were south-westerly. The site was bounded on the north and west by fields belonging to the vendor, on the south-west by a public road, and on the east by the railway-cutting. The hospital generally would consist of five separate



blocks—two wards, an administrative block, a wash-house block, and a mortuary block. Mr. Gale then proceeded to describe the plans to the Inspector, and stated that his estimate of the cost of carrying them out was £2,916. The Inspector was asked to let the Board know the result of the enquiry before the end of the present month if possible, as the vendor had already twice extended the time for the completion of the purchase. The Inspector said it was quite hopeless that the Local Government Board could give its decision by the date named, but the matter should be urged on with all possible expedition.

#### SANITARY AND ENGINEERING NEWS.

**SEWERAGE OF RINGTON, NORFOLK.**—Application having been made to the Local Government Board for sanction to borrow £1,000, for works of sewerage for the parish of Rington, an inquiry was held by Mr. Thomas Codrington, M.Inst.C.E., at the Rington reading-room, on the 24th ult. Mr. R. M. Parkinson, A.M.Inst.C.E., described the plans.

**SEWERAGE WORKS, COLCHESTER, NORFOLK.**—Mr. Thomas Codrington, M.Inst.C.E., Local Government Board Inspector, held an inquiry at the Suffield Park Hotel, on the 23rd ult., in consequence of an application having been made to the Board for sanction to borrow the sum of £2,000, for works of sewerage in connexion with the Suffield Park district. Mr. Parkinson described the plans, and said it was proposed to take the sewer through the lighthouse hills, and to have an outfall on to the beach to extend to low-water or ordinary spring-tides. This outfall would be fixed at a spot about seventy yards east of the boundary between Cromer and Overstrand.

**THE SANITARY INSPECTORS' ASSOCIATION.**—In connexion with the course of lectures and demonstrations arranged by the Sanitary Inspectors' Association for Sanitary Officers, Professor Vivian B. Lewes, F.C.S., F.I.C., delivered the third of a series of five lectures on "Combustion, and the Influence of its Products on Health," at St. James's Hall, Piccadilly, on Monday evening. Mr. Alexander, of Shorehithe, presided. The lecturer said it must have occurred to those present, while he was speaking of carbon-dioxide, that inasmuch as carbon-dioxide was being generated by a large number of different gases on the face of the earth, it must be gradually increasing in quantity. Moreover, seeing that they could only have a very minute quantity of carbon-dioxide present without there being something at work in nature which would reduce the quantity of this gas and revivify the atmosphere. They could not reduce the oxygen by a quarter per cent., nor increase carbon-dioxide by one-tenth per cent., without affecting health and life. How, then, did nature succeed in keeping the atmosphere in a constant condition for us to live in, while they had on the one hand oxygen being withdrawn, and, on the other hand, carbon-dioxide being put into the atmosphere? Faraday, in the middle of the present century, calculated how much oxygen was daily used and converted into dioxide. The population, in the course of respiration, used up an immense amount, and animals even more, while combustion used up as much as did the respiration of the population; finally, there were fermentation and other processes working and doing the same thing, the amount of oxygen used in a day being 33 million tons. How was the balance kept perfect? Nature had specially arranged for this in some most beautiful ways. In the first place, carbon-dioxide was a compound built up of carbon and oxygen. He had shown them how it was built up by respiration, combustion, &c., and it was equally a fact that they could break up carbon-dioxide once again into carbon and oxygen. Professor Lewes gave a demonstration of this process, effected by means of potassium, and he said that the fact of their being able to accomplish that was a fundamental part of the secret by which nature converted the carbon-dioxide which formed on the surface of the earth and rendered the air fit for them to live in; wherever there was vegetation growing it was undoing the pollution of the atmosphere, brought about by animal life, the oxygen which had been used up being again liberated. The moral of this was that they should crowd their living-rooms with plants. Wherever they had the sun's rays, or what they termed diffused daylight, vegetation would be doing its work. At night there was generally a slight reflex action and a slight giving-off of carbon dioxide, and this pointed to the fact that in their sleeping-rooms plants were not as good as in living-rooms, where they did most admirable work. It was the growth of big vegetation that kept the atmosphere fit for them to live in. The lecturer next dealt with the diffusion of gases, and explained how strong the action of diffusion was. These two natural laws, he said—the action of diffusion and the action of plant life—sufficed to keep the atmosphere in so constant a condition that it took fifty years for the philosophers to find out that it was a mechanical mixture and not a chemical compound. So rapidly did diffusion take place, and the gases find their way even throughout the atmosphere, that it was impossible in any town to detect any carbon-dioxide. As far as nitrogen, oxygen, and carbon-dioxide were concerned it was only by tests of a delicate character that

differences were found to exist. Concerning local impurities, which the lecturer said existed only where there was cause for them, they were many in number, and might be divided into solids, liquids, and gases. Having referred in some detail to these impurities under the three headings mentioned, he spoke of the actions which carry on life, dealing especially with the manner in which, by the diffusion of oxygen into the blood, nature gets rid of the used-up matter in our bodies. Professor Lewes's fourth lecture will be delivered next Monday evening.

**SEWAGE DISPOSAL WORKS, UCKFIELD.**—At the last meeting of the Uckfield Local Board formal sanction was received from the Local Government Board to a loan of £2,000, for sewage disposal works. These works comprise the lifting of the sewage by pumps worked by a gas-engine a height of 30 ft., and the disposal of the sewage by broad irrigation on 8 acres of land. At present the sewage is screened and partially precipitated and then discharged into the river. The new works were necessitated by the action of the East Sussex County Council, taken under the Pollution of Streams Act. Mr. W. Willis Gale is the engineer for the scheme.

#### FOREIGN AND COLONIAL.

**FRANCE.**—The number of demands for admission to compete for the 1900 Exhibition buildings has now risen to 600 (!).—M. Marcel Daly, editor of the *Semaine architecturale*, has been appointed as an expert in connexion with the Commission of the Seine.

**FRANCE.**—The excavations commenced some years ago at Saintes (lower Charente), are to be continued, and an architect has been appointed by Government to direct the works. The excavations carried on in the little old town of Vézelay have led to the discovery of a good many archaeological remains, especially of the remains of the thirteenth century, Roman and Medieval coins, and tools. The whole have been placed in the small museum of the town.—M. Formigé has returned to Paris from Orange, where he had been sent by the "Commission des Monuments Historiques," to study the works to be executed at the Roman theatre in preparation for the Classic dramas which are intended to be represented there. According to M. Formigé, the work can only be done very slowly, as he has set himself scrupulously, in repairing the theatre, to preserve intact every stone and moulding of the original building which remains. The work is going on, but it will not be completed for several years.—The exhibition of the Fine Arts Society of Nice will be held in the Crédit-Lyonnais building in January.—A committee has been formed in the little town of Cavillon (Vaudouze) with the object of carrying out the construction of a series of boulevards and promenades in the town.

—The bronze statue to Claude Bernard, the work of the Lyons sculptor, M. Aubert, was inaugurated on Sunday last, in the "Cour d'Honneur" of the buildings of the Faculty of Medicine at Lyons.—The carelessness of the Fine Arts Department in regard to the curious and interesting ruins of the town of Baux in Provence, which are going to pieces more and more each year, is attracting attention in the South of France. It is intended to appeal to the Government to class them as Historical Monuments, and place them under the care of architectural inspectors.

**GERMANY.**—The Annual General Meeting of the *Verenigung Berliner Architekten* was a satisfactory one, as the executive of this energetic Society could report much good work done. There had been several valuable publications; the arrangement of the Architectural section at the Salon; the Congress of German Church Architects; and a number of competitions, excursions, &c., managed under their auspices, as well as the usual meetings, with a number of interesting discussions. Herr von der Hude remains President for the coming Session. The Council will include Herr Kayser (Kayser & Grossheim), Herr Seeling, and Herr Solf.—The Annual General Meeting of the older society, the *Architekten Verein*, did not speak so well of the energy of its Council. The Session 1893-94 was as usual without any special events, except the special meeting held in honour of six members who have now been on the rolls for fifty years. A paper, "Berlin fifty years ago," was read on the occasion.

—The Prussian Royal Academy of Arts invites Prussian architects to compete for a Government Travelling Studentship worth 1651. According to the new revised "programme" no special work need be prepared. Candidates can send in drawings of work either carried out, old academical designs, or competition work, and the premium will be awarded to the architect who shows the greatest ability, judged comparatively, for a only Government age of the candidate, which must not exceed thirty-two.—The subject for the annual Schinkel competition is to be "A National Hall on the lines of Westminster Abbey" (!), whatever that may mean. We are curious to see the particulars of the competition "programme."—The next meeting of the delegates of the various German architectural societies will be held in August, 1895, at Schwerin.—The next biennial gathering of the amalgamated societies will be held at Berlin in 1896.—Churches seem to be now inaugurated at Berlin at the rate of about one a month. The last two were by Herr

Hasack and Herr Moeckel respectively. Herr Hasack's is a catholic church, costing £18,000. It holds a congregation of 1,000 persons. We have received a copy of a new illustrated "House and Tenement Gazette," which is being published at Berlin. Every building, flat, or even lodging that is advertised is illustrated by plans set out to scale and with the north point marked on them. "House-hunting" will thereby be greatly facilitated, especially as comprehensive particulars as to price, &c., are also given. Workmen are still constantly employed at Cologne Cathedral finishing the extensive "restoration." The official report of the architect in charge, Herr Voigt, shows that much mosaic-flooring was done during the last twelve months, and that some elaborate wrought-iron railings have been put in hand. A number of tombs have been opened, among others three, under the altar, dating from the sixteenth century.

#### MISCELLANEOUS.

**PROFESSOR HERKOMER ON ART TEACHING.**—On the 29th ult. Professor Herkomer delivered a lecture at the London Institution on "Light and Seeing, or Art Tuition." According to the *Daily Graphic*, the lecture began, after the definition that all questions of art turned on the ability to see and to see rightly, with a denunciation of the methods of South Kensington. The result of the South Kensington school's teaching had, by no means been a justification of itself; it had had the effect of impersonality; it inaugurated a system of teaching lifeless, humdrum, soul-deadening; it was the despair of masters, the disappointment of students. He would have no South Kensington system extending all over the kingdom, but a separate school in every town. Each town should work for its own hand. Each school would be of time and individuality of its own. It was individuality which gave vitality to art. From this general scheme Professor Herkomer passed to an exposition of the principles which should guide the teaching of the individual school. Its great and leading principle should be that the student should be taught to see things as they are. Under this system the drawing from the antique—a waste of time—would be dispensed with and would be replaced by drawing from the life cast. Drawing from the life-cast would be accompanied by painting from the living head, and the ultimate aim of the student, the one thing necessary for the fulfilment of his training, was drawing from the nude—the most elevating, the most inspiring, the most purifying, of all forms of art learning and art practice.

**CONFERENCE OF MASTER-PAINTERS AND DECORATORS.**—The International Convention of Master-painters and Decorators was resumed on the 21st ult., at the Memorial Hall, Manchester, Mr. George Laidler, of Newcastle-on-Tyne, presiding. Further questions relating to organisation were under consideration.—Mr. John Taylor (Birmingham) read a paper on "The apprenticeship system," in which he urged the importance, in the interests of the standing of the trade, of reviving the system of engaging apprentices by indenture.—On the motion of Mr. Taylor, seconded by Colonel Bennett (Glasgow), it was resolved:—"That it be a recommendation from this meeting to the members of the Institute of House Painters and Decorators, and to the painting trade generally, that the practice of employing unattached boys be discontinued, and that an earnest endeavour be made to revert to the wholesome habit of indenturing boys to the trade." A paper on "Job Lots and Short Lengths in the Paper-hanging Trade" was read by Mr. W. H. Goodier (Sheffield), who referred particularly to the extent to which job lots of paper hangings are hawked about the streets and sold by auction, to the detriment of men who are regularly engaged in the trade. The observations of Mr. Goodier were borne out by those who took part in the discussion, and on the motion of Mr. W. G. Sutherland, seconded by Mr. Woodnorth (Whitehaven), it was resolved:—"That this meeting is of opinion that the practices described in Mr. Goodier's paper are inimical to the best interests of the trade, and that a committee be appointed by this Conference to further consider the matter and report upon the same to the executive of the new Association as basis of concerted action, and further that Mr. Goodier's paper be printed and circulated among the members of the Association." There was the adjournment for luncheon, and before John Whyte (Aberdeen) were read, in the absence of the writers, by Mr. Cantrell, the Secretary, M. Whyte, in his paper, declared that the employers themselves were in a large measure to blame for the present conditions of things they inveigh against. Whilst the universal cry was for technical education amongst the workmen, the employers themselves were in many instances incapable of appreciating any advance their workmen might make—indeed, blocked the way by their own insufficient knowledge and counting-house experience.



*Institution of Electrical Engineers.*—(1) Mr. H. D. Wilkinson on "Electric Tramways in the United States and Canada." (2) Messrs. R. W. Blackwell and Philip











ST. GEORGE (near Bristol).—For elementary schools, Green, bank. Mr. F. High Bond, architect, Liverpool Chambers, Bristol. Quantities by Mr. W. L. Bernard, St. Sepulchre's Chambers, London.

	At final for state roofs.
C. Williams .....	£12,660
S. A. Hayes .....	11,577
H. A. Forde .....	11,460
J. E. Davis .....	11,454
W. Cowlin .....	11,440
E. Lowe .....	10,968
J. Perrott .....	10,934
G. Walters .....	10,919
C. H. Wilkins .....	10,880
R. Wilkins & Son .....	10,723
G. Humphreys .....	10,770
W. Field & Son .....	9,547
F. Martin .....	9,424

Accepted with addition of slate roofs.  
STAFFORD. Success—For the construction of a 100 ft. x 12 ft. in. and 10 ft. in. deep, &c. for the local board. Mr. H. A. Miller, C.I., Surveyor, Town Hall, Stafford.  
Steele .....

Southampton.—For alterations and additions to No. 12, Waterloo place, into business premises, for Mr. R. Allen. Mr. William Burroughs Hill, F.S.I., architect, Southampton.  
Playfair & Co. .... £2,540  
J. J. Udall & Co. .... 444  
Henry Cawte .....

Southampton.—For alterations and additions to No. 12, St. Mary's-street, for Mr. R. Allen. Mr. William Burroughs Hill, F.S.I., architect, Southampton.  
Playfair & Co. .... £2,540  
J. J. Udall & Co. .... 444  
Henry Cawte .....

STOW-IN-THE-WOOD.—For a dwelling and house, at 500 yds. pipe sewers, with manholes, &c. for the Rural Sanitary Authority. Mr. G. B. Watts, C.E., Hill House, Leckhampton, near Cheltenham.

W. Lee .....	£2,140
George Camplin .....	2,538
Henry Hill .....	2,521
John White, jun. ....	2,174
Stephen Ambrose .....	2,163
Herbert Weddon .....	2,144
Johnson & Co. ....	2,112
Sanitary & Economic Association, Ltd. ....	2,110
J. & G. Howman .....	2,072

Sanitary & Economic Association, Ltd. ....	£2,110
John White, jun. ....	2,174
I. H. Firbank .....	72
Mark Williams .....	69
D. H. Porter .....	64
J. & G. Howman .....	64
Stephen Ambrose .....	57
T. J. Davies .....	57
Economic Fencing Co. ....	57

WALSALL.—Accepted for the construction of a 100 ft. x 12 ft. in. and 10 ft. in. deep, &c. for the Corporation. Mr. H. H. Middleton, Borough Surveyor, Walsall.  
James Atkins, Walsall .....

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James Atkins, Walsall .....

WESTON SUPER MARE.—For the erection of a shop, house, &c. for the Corporation. Mr. T. J. W. Davies, architect, Weston-super-Mare.  
C. Addicot .....

WILKIN.—Accepted for the erection of a 100 ft. x 12 ft. in. and 10 ft. in. deep, &c. for the Corporation. Mr. H. H. Middleton, Borough Surveyor, Walsall.  
James Atkins, Walsall .....

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# TO CORRESPONDENTS.

H. & W. J. L. T. B. J. S. H. C. (amounts should have been stated).—O. W. "Student" consult a pocket-book of engineering formulae. There are many to be found in the T. B. J. S. H. C. for this week.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.  
If cannot undertake to return rejected communications.  
Letters or communications between correspondents which have been duplicated for other journals are NOT DESIRED.  
All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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# The Builder.

VOL. LXVII No. 2701.

NOVEMBER 10, 1894.

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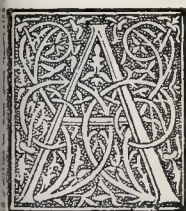
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### The Distribution of Power.



At the present time, when so much depends upon conducting the various industries of a country in the most economical manner, there could be no subject of greater interest and importance to either the scientific or business man than that dealing with the generation and distribution of power.

It will appear evident to most of us that at least theoretically it should be more economical to generate power on a large scale at a central station, and to distribute it to consumers that they may be able to use it in such quantities and at such times as best suits their requirements, than for these consumers themselves to produce it at the several places where it is used.

A popular example of the production and distribution of a particular form of power is provided by the various gas companies. In all large towns this source of power is always available, and can be used in large or small quantities. There are, however, many other kinds of power available, and as there are several methods of distributing such energy, a knowledge of many departments of engineering is necessary to enable any one to thoroughly investigate this subject. Scientifically we speak of energy being generated, and it is desirable to regard this energy as a commodity which can be manufactured in a convenient form, capable of being transmitted to considerable distances, and distributed and sold to consumers.

It is essential in an investigation of this nature to remember that energy cannot be created, and that the utmost we are able to do is to change one form of energy into another form which is more suitable for the special kind of work we require it to perform. It is, of course, impossible to extract from any machine more energy than we put into it, but we are able to bring a particular form of energy to it, and exchange that for an equivalent of another kind that may suit our purpose better. Take, for example, the production of electricity, of which we hear so much at the present day. Large buildings are erected, stocked with machinery and steam-boilers for the production of this particular kind of energy, but all the dis-

coveries that have been made in electrical science only enable us to obtain another form of power, for the generation of which we have to exchange an equivalent quantity of another sort—namely, that which is contained in the coal required to raise steam.

One of the most convenient forms of mechanical energy is that known as hydraulic power. Water power is by no means a new force, but water power as formerly understood was limited in its application to systems of mechanism suitable for the low-pressures found in Nature. The results that have been obtained by the use of high-pressures are so different from all previous experience that a new name was needed, and we now term this particular form of energy Hydraulic Power.

Theoretically nothing could be more simple than this system. For working such machinery as cranes, lock-gates, lifts, &c., which are only required to be in action for short periods, and intermittently, it is unequalled. At the present time there are two systems in general use, the low-pressure system with reservoir storage, in which the pressure generally ranges between 150 lbs. and 250 lbs. per square inch, and the high-pressure system with accumulator storage, the usual pressure in this case being between 700 lbs. and 800 lbs. per square inch. In the latter case there are often several stations for generating the power, from which it is conveyed by mains to the various consumers, who may be scattered over a very considerable area.

The loss of power due to friction in the mains is insignificant with high-pressures, and is not of very great importance even with low-pressures. The first attempt to distribute high-pressure water to several consumers was made at Hull. The principal main here is 6 in. in diameter, and about three-quarters of a mile long. The quantity of water used is measured in each case by meter, and its cost is determined by a scale of charges based on the yearly amount taken by the consumer.

In 1871 an Act was obtained for supplying hydraulic power in London, but the present company was not constituted until about ten years ago. In 1887, however, there were some twenty-five miles of pressure-pipes laid in the London streets, and these have been so extended of late years, that at the present time there are no less than sixty miles of these mains. For generating the pressure there are three principal pumping-stations, one near the Blackfriars Bridge,

another at Westminster, and the third at Wapping. Another in the City-road is now being constructed. The aggregate power of all the stations, when complete, will be but very little under 4,000 indicated h.p. The water needed is mostly taken from the river, and is filtered before being used. After use it is not returned to the pumping-station, but allowed to run into the sewers.

This company makes a minimum charge of twenty-five shillings per quarter per machine, but for consumers using larger quantities of water there are graduated charges, decreasing as the amount used increases.

Professor Unwin, in his important work\* on the transmission of power, which has furnished the subject of this article, points out that the cost of power for the kind of work for which a hydraulic system is best suited will be found to be small, being often less than one farthing per ton raised 50 ft. As already stated, however, it is only where power used intermittently is required that this system will be found economical; if employed for machinery working continuously, its cost is greater than for power obtained in other ways.

Another means of transmitting power from a central station to several consumers is that known as the compressed air system. For hydraulic power, the water needed has often to be purchased, and sometimes filtered, and means must be provided for allowing it to flow away after it has done its work. With air, however, the case in these respects is much more favourable, since it is always available, and can be discharged anywhere after use without creating any nuisance. The necessary motors worked expansively are efficient, the loss in the mains is very small, and the differences in level between the compressing and working points are unimportant.

In both the great installations in Paris and Birmingham it has unfortunately happened that there are conditions of development very unfavourable to the complete and fair trial of compressed air as a means of transmission; and Professor Unwin states that it is reasonably certain that with greater attention to scientific principles better results are obtainable than have hitherto been reached in the use of compressed air. In Paris there are motors ranging in power

\* "The Development and Transmission of Power from Central Stations, being the Howard Lectures delivered at the Society of Arts in 1893." By William Cawthorne Unwin, F.R.S. London: Longmans, Green, & Co. 1894



between  $\frac{1}{10}$  h.-p. and 150 h.-p., the majority being under 1 h.-p., and this fact alone shows how easy it is to subdivide the power in a compressed air system. The motors can be started and stopped by merely opening and closing the supply-valve, and there is no practical difficulty in measuring the quantity of air used.

In the Paris system the length of the principal mains is some thirty-four miles, and the loss of pressure due to friction in these mains rarely reaches 8 lbs. per square inch. The new main from the Quai de la Gare to the Place de la Concorde is 20 in. in diameter, the air pressure being 90 lbs. per square inch.

Professor Unwin also deals in his work with pneumatic transmission in a very exhaustive manner, describing the many different kinds of motors and compressors now in general use, and examining the various installations both in this country and on the Continent.

The utilisation of the enormous energy which is continuously expended at the Niagara Falls has always been a favourite subject of contemplation with engineers. The lakes that extend half-way across the continent of North America form storage reservoirs for the rainfall on an area of one quarter of a million square miles, the water flowing ultimately through the Niagara River, falling 326 ft. in a distance of 36 miles. The average discharge through this short river has been estimated at 300,000 cubic ft. per second, a volume sufficient to yield some 7,000,000 h.-p., it could all be utilised.

From very early times water-mills were built in the rapids above the Falls, but in 1853 a more important scheme was started, and by 1861 a "hydraulic canal" had been constructed 35 ft. wide and 8 ft. deep, which receives water at a point nearly a mile above the Falls. This canal conveys water to a line of mills, and furnishes about 6,000 h.-p. Owing to the success that attended this scheme the canal has recently been enlarged, and is now capable of providing much greater power.

In 1886 the Niagara Falls Power Company was formed, and a charter was obtained from the State of New York, giving full right to construct the works necessary to utilise 200,000 h.-p. As Professor Unwin states, this project involves special difficulties. The works are of unprecedented magnitude, not only in the aggregate, but in detail and in the size of individual units. The commercial condition is also an absolutely governing one. Steam power is cheap in the district, and unless the water power can be distributed at a price less than that of steam power, the market for it would be very restricted. The fall is so advantageous that the cost of power at the turbine shaft will be extremely low, but if heavy charges are needed to cover expenditure on distributing machinery its development will be useless.

The works now being carried out on the United States side, and partly completed, consists of the construction of a head-race canal 200 ft. wide, 1,500 ft. long, and 17 ft. deep, as well as a great tunnel tail-race about  $1\frac{1}{2}$  miles long, 21 ft. high, and nearly 19 ft. wide. The net section of this tunnel is 386 square feet, and it will discharge the tail water of turbines developing 100,000 h.-p. The Canadian Government have recently granted a charter to a company for similar works on the other side, and the conditions for developing power here are more favourable than on the American side of the river.

Besides the various methods of producing and distributing power to which we have already alluded, Professor Unwin discusses many others, such as Electrical Transmission, Telo-dynamic Transmission, the distribution of Gas and also of Steam for power purposes. The space at our command, however, does not permit us to comment upon these subjects further than to state that they are as fully described and illustrated in the book as those which we have briefly considered.

Probably no one is more capable to write such a work as the one now before us than Professor Unwin, who has long been recognised as one of the greatest authorities on these subjects, and we feel that in this case the book requires no further recommendation than to state the name of its author.

#### NOTES.

**T**HE Egypt Exploration Fund has just issued its third annual Report, which contains a fairly full notice of the exploration of the curious temple at Deir-el-Bahari, Thebes, a building that was almost entirely buried beneath masses of fallen earth from the sloping hills at the base of which it was erected, while this was even added to by the raised level made in later centuries, when a Coptic monastery was built over part of the buried temple. The plan of the building is peculiar, and has evidently been arranged on account of the peculiarities of the site. A wide platform, supported by retaining walls, extends in front of what is styled the middle colonnade. The latter consists of two rows of so-called neo-Doric columns of sixteen sides, capped with a square abacus. They are open in front, but at back is the retaining wall of a lengthy terrace at a higher level. Facing this terrace, and extending to the base of the cliffs, is an upper platform, in the form of an open court, having on the left a Hall of Offerings, and on the right an enclosure with massive walls, containing a huge altar formed of large masonry blocks, open to the air. To the left of the middle colonnade is a curious shrine, dedicated to Hathor, while to the right is one of the most interesting of the portions cleared. It is a spacious hall of three ranges of columns, each four in number, the front row ranging with those of the colonnade. Its flat stone roof remains in part. Behind it is a three-chambered shrine of Anubis, and at right-angles is a long line of single columns, with a retaining wall behind them backing on to the cliffs. Four rock-cut chambers with built ceilings in the form of pointed arches open from it. This colonnade appears never to have been completed. The work, judging by a good plan which accompanies the description, is set out with great regularity and system, and it may be noted that the angles of the principal buildings, and those of the great altar, are directed very nearly to the cardinal points, rather than the axes being so arranged. Interesting details are given of objects found, of the various sculptures on the walls, and of their partial obliteration during a later dynasty, and three good photographs of the portions cleared give a fair idea of the difficulties that had to be encountered, and of the design of the buildings. The account of the researches by the Society, which is by M. Naville, is followed by another on the progress of Hieroglyphic Studies and kindred matters during the year by the editor; while Mr. Cecil Smith contributes a record of Græco-Egyptian Antiquities, Mr. Kenyon another on Literary Discoveries in the same field of inquiry, and Mr. Crum concludes with notes on Coptic Studies.

**T**HE date for the opening of the Imperial Houses of Parliament at Berlin has again been postponed, this time owing to the resignation of Chancellor Caprivi. December 5 is the new date. In the meantime the Emperor continues giving expression to his dissatisfaction with Herr Wallot's work in a most forcible manner, whilst the artistic bodies do everything to show their appreciation of the architect's efforts. The distribution of the Government Gold Medals which are annually awarded at the Berlin Salon has to be submitted to the Emperor's approval, the Prussian Royal Academy acting as assessors. Herr Wallot was to be the recipient of one of the "first" medals, but the Emperor has struck his name off this

list and put him down for a minor distinction; a lady-painter, Mrs. Parlaghi, is to have the medal instead. This lady is the same Court favourite whose works were but lately refused by the hanging committee and then exhibited by Royal command. According to the Berlin local press Mrs. Parlaghi was to have had a small exhibition in one of the rooms of the Prussian Royal Academy, thanks to the Emperor's patronage. The authorities (to their credit) have, however, apparently refused point-blank, and the Emperor has now had to order the curator of the National Gallery to make room for the favoured pictures. This may be all very amusing for outsiders, but it must be rather irritating to German architects and artists.

**I**N the obituary notice of the late Mr. Walter in the columns of the *Times* it is stated that Mr. Walter was the architect of his own house, Bearwood, and of the new offices of the *Times* which "face Queen Victoria-street with an imposing front" (!). It is really supposed in Printing House-square that this warehouse front is a specimen of architectural design, and justifies the assertion that the late owner of the paper had "a very marked capacity for architectural design," we need no longer wonder at the kind of hereditary indifference to and ignorance of architecture which has so long characterised the *Times*, or at the prominence given in its columns to Lord Grimthorpe's swaggering absurdities on the subject of architecture. In this respect he and the late proprietor of the journal must have been kindred spirits. In regard to Bearwood, it has always been understood that Professor Kerr was the architect; and if we are not mistaken, an elevation or perspective view of the house, as his design, was exhibited a good many years ago under his name either at the Royal Academy Architectural Room or at the "Architectural Exhibition" which was the general medium for the exhibition of architectural designs before the Royal Academy Architectural Room was instituted. However this may be, the claim of architectural nobility for the street-front of the *Times* offices is something too absurd.

**T**HE dispute between the Corporation of Sheffield and certain house-owners in a street which has been sewered by the Corporation, as to whether the house-owners ought to contribute to the cost of the sewer under the special circumstances, has been brought before the Court of Appeal. The point was that the houses in question were already connected to drains at the back, and did not need a sewer in front, except for rain-water and some sloop discharges, and that therefore they were not called on to pay for the making of anything except a 3-in. drain for this purpose. The Corporation objected to any interference with their general scheme of sewerage, but the stipendiary magistrate of Sheffield appears to have held with the defendants, that the Corporation had no right to charge them for sewerage work which was unnecessary to them. The Court of Appeal upheld the magistrate's decision, and thought the case was one which ought not to have been brought into either Court. We are by no means sure of that. The Corporation were unquestionably quite right in not wishing the completeness of their sewerage scheme to be interfered with, and the refusal of the defendants to contribute to the length of sewer in their street may become a precedent that will be made use of in a manner prejudicial to the sanitary work of the Corporation in the town. We cannot by any means understand the rather contemptuous tone of the learned Judges, which appears to us to have arisen from an imperfect comprehension of the real bearing of the case, and its possible effect on sanitary work in Sheffield.

**I**T is proposed to form an association of cement manufacturers to keep up the quality of manufacture of English cement.



In a circular which has been issued to manufacturers with this object, it is stated that some manufacturers of English Portland cement are largely adulterating their manufacture by the mixture of Kentish rag stone, other stone, furnace or oven ashes, disused or exhausted firebricks or other inert material, and so bringing disrepute upon the good name English cement has hitherto borne in comparison for quality with cement of foreign manufacture. The proposed association of English cement manufacturers is for the purpose of dealing with and, if possible, putting a stop to a practice so unprincipled and disreputable, and so calculated to perpetuate an injury to the trade. Manufacturers of cement have been invited to say whether they will attend a meeting, to be convened, to consider the subject.

WE have received a copy of a very useful Report by Mr. W. N. Blair, the Engineer and Surveyor to the Vestry of St. Pancras, on the question of pitch-grout versus cement-grout for laying wood-paving. The Report is accompanied by a great number of replies on the subject from Borough Engineers in London districts and in provincial towns, the great majority of which are in favour of pitch-grouting. Among the points stated in favour of the pitch-grouting, both in the replies and in Mr. Blair's own summary, are that it is more elastic than the cement and does not consequently tend to wear the edges of the blocks or drive them out of level; it absorbs expansion and gives way to contraction of the blocks, so that no movement is transferred to the channels, and no pressure to bear against the kerb to cause displacement; it makes thinner joints, and allows of traffic being turned on to the road as soon as the joints are run. The only objections against the pitch-grouting mentioned in Mr. Blair's report are, that it can only be made on dry material, and in wet weather the blocks have to be covered with tarpaulins, and that its cost is 50 per cent. more than cement-grouting. In spite of this latter objection, however, a motion submitted to the St. Pancras Vestry recently, "that no more pitch-grouting be used, either for wood or any other paving, until further information be obtained as to its utility," was, on the basis of the Engineers' Report, rejected by a large majority.

AFTER the information contained in the Report referred to in the preceding "Note," it is rather amusing to find on opening the Report of the Surveyor of St. Martin's-in-the-Fields (Mr. C. Mason) a marked paragraph to the effect that the creosoted wood-blocks (in Wellington-street, Whitehall, Strand, &c.) have been grouted with Portland cement and fine sand, and that this system not only ensures a cleaner surface for scavenging, but that it is expected the life of the pavements will be lengthened, "there being less concussion and consequent vibration than when laid with the joint." Thus the two Surveyors are at absolute variance on the subject; but Mr. Blair certainly produces a very large bulk of evidence in favour of his view, and we are inclined to believe it is the right one. From Mr. Mason's report we further learn that the question of lighting the streets by electricity has been under the consideration of the St. Martin's-in-the-Fields Vestry, but the scheme has been abandoned owing to its cost being greater than that of lighting them with gas. Mr. Mason mentions that the roadways of the Strand and Long-acre have been cleansed by flushing with a hose fixed to the hydrants, and that this is the most effectual method of cleansing, but that the cost of the water is too great for a further application of it. This touches on a very large subject—viz., whether, with the present inadequate supply of pure water to London, we are justified in throwing away much of it in washing streets; or rather, whether there ought not to be an attempt to utilise some special supply for this purpose, of

water that cannot be used for household purposes. The possibility of a sea-water supply for street washing has been before suggested, and may be well worth considering.

IT is somewhat startling that we should have to comment on a case decided in the Admiralty Court, but that of the *John Stirling*, just decided, seems to throw some light on the future of the Manchester Ship Canal. The case arose out of a collision between a small paddle steamer, the *John Stirling*, and a large, though not a very large sea-going steamer, the *Martin*. The cause of the collision was simple: the *Martin* sheered out and so struck the *Stirling*, and the question therefore arose, was this sheering unavoidable or was it the result of some negligence on the part of those who were navigating the *Martin*? The judge held that the difficulties of navigating the Ship Canal were so great for large steamers that extraordinary care was necessary, and that if more care had been used by those on the *Martin* the collision might have been avoided. But if an ordinary seagoing steamer not of the largest size cannot go through the Canal without the most extreme caution, must crawl along at some four miles an hour with the danger at any moment of sheering out and so sinking another vessel, what are the probabilities of considerable traffic? It has to be borne in mind that the mere impact of two large iron steamers is often disastrous simply by reason of their weight, that it takes much time and care to bring them through locks, and that the tendency of modern shipbuilders is to increase the size of steamers. One swallow does not make a summer, and one collision will not stop the traffic of this Canal; but it must be confessed that the facts made public by the case we refer to show that the difficulties of navigation in the Canal are greater than were supposed, and that it is quite certain that shipowners will not be very eager to allow their ships to enter it.

THE case of *Wright v. Hennessey*, which came before the Queen's Bench Division last week, though of some importance, must not be regarded as containing definite judicial dicta. The application was one to continue an injunction, obtained by the plaintiff in the Vacation, until the trial of the action. The first part of the injunction was to restrain the defendant, who is Secretary of the National Association of Operative Plasterers, from attempting to induce persons who had entered, or who should hereafter enter, into contracts with the plaintiff to break them. The second, and quite separate head, was to restrain the defendant from inducing men employed on some work of the plaintiff from going on strike. The defendant agreed to give an undertaking as to the first head, and the Court intimated that if he had not done so they would have continued the injunction to this effect. But, as to the second head, nothing was done, the Court considering that on this point the law is not clear. To the ordinary mind there is no great distinction between inducing persons who have entered into contracts from breaking them, and persons who are working for an employer from going on strike. To discuss the question would require space, and it is doubtful if it would have any practical result. It must suffice to note this case, not as laying down new legal principles, but as approving the law as it stands. The subject may probably come up for discussion in this very case, since there is a claim for damages which has yet to be decided; and if this should happen, further light may be thrown on this very important matter.

IT seems probable that the open view of the west front of Bath Abbey Church, shown in our illustration last week, will not remain, as John Stuart Mill would have put it, "a permanent possibility of sensation." The new Pump-Room buildings will overlap the front to the extent of about a quarter of

the façade. The Local Government Board has drawn attention to this, and expressed a desire that the Town Council of Bath would reconsider the matter, with a view to setting the new buildings back, so as to leave the front of the Abbey entirely clear. We wish that this had been considered from the first, as it certainly ought to have been. But it is to be feared that the recommendation comes too late now. As the Town Council did not consider it in the conditions of the competition in the first instance, it will seem hardly reasonable to ask them at the last moment to suspend their new building and commence the plans over again, which would be the necessary consequence. The matter should have been thought of earlier.

LAST Saturday, November 3, an interesting function took place at Newnham College, Cambridge. The gates subscribed for by the past students in memory of their first principal, Miss Clough, were formally presented to the College. More than 800*l.* had been subscribed, of which 750*l.* has been expended on the gates. At the close of the proceedings the architect of the College, Mr. Basil Champneys, gave an account of the methods adopted in the design, and its technical working out. The material is a special kind of bronze, 9 parts of copper to 1 of tin, this combination giving the most appropriate combination of strength and malleability. The main stanchions on which the gates depend are of iron with a thick coating of bronze. The foundation of the design is an elaborate system of scroll-work, and the lines of these were, in all cases, determined before the clothing of foliage was added. The scroll-work is all cast in metal and then bent to the desired curves, the foliage being partly screwed and partly brazed on to the scrolls. In its general style the foliage is of the kind first introduced into England from France about the end of the seventeenth century, and of which the gates at Hampton Court are the earliest example; but these gates Mr. Champneys characterised as somewhat lacking in discipline as to design and solidity of workmanship, and cited one or two other examples as better worth study in this respect. The Newnham gates owe to these predecessors, however, little more than the type of foliage. One element also in them is conspicuously new. The subscribers had requested that if it was decoratively possible the favourite flower of their Principal—the sunflower—should be introduced into the design. This has been done by Mr. Champneys with fine effect, the formality of the sunflower border contrasting with the freer lines of the panels. The memorial inscription occupies two pear shaped plaques, and above them the Clough arms appear on two corresponding lozenges. The design was carried out, with a skill and conscientious care upon which Mr. Champneys laid special stress, by Mr. Elsley of Portland-road.

THE recent appropriation of the old bath called "the Earl of Essex's bath," by the pulling down of the old house in Strand lane, Strand, in which it was contained (if the site of the Norfolk Hotel), is likely to deprive London of a relic of the past which is both interesting and useful. The bath is supplied by the spring that fills the adjoining Roman bath. For a while it remains beneath the flooring of a side kitchen in the basement of the hotel, which has been erected under a building-lea granted by the Duke of Norfolk, and will shortly be opened. We understand, however, that, failing any measures for its preservation, it is proposed to empty the bath by diverting the flow of water. If that event it will probably be filled in, utilised in some way that will obliterate its existence altogether. We may here observe that Essex House, so-named after Robert Devereux, Earl of Essex, stood on the site



the Outer Temple, where are now Devereux-court and Essex-street, between Middle Temple and Milford-lane, and was originally built for the Bishops of Exeter on lease from the Knights of St. John. Between Milford-lane and Strand-lane was Arundel Place, formerly the town house of the Bishops of Bath and Wells, bought for 41l. 6s. 8d. by Henry FitzAlan, Earl of Arundel, ob. 1579. Essex House had belonged for a term to Thomas, Duke of Norfolk, who parted with it to the Earl of Leicester; a portion of it remained until 1777; Arundel Place, or House, was taken down in 1678.

AMONG the personal or "one-man" exhibitions at present open, the most interesting is that of the "Facts and Fancies" of Mr. Sainton at the Fine Art Society's rooms. These are studies in water-colour, executed in a slight but very effective manner, of real or ideal female figures, the ideal subjects being mostly of the entirely symbolical class—figures representing "Aurora," the "Spirit of the Loch," "Daughters of the Gods," &c. These latter are treated mostly in a manner rather suggestive than pictorial; they are visions of figures which keep a dream-like colour and consistency, as of partly aerial beings. In this respect the "Daughters of the Gods" (18), the largest work, is a pleasant poetical suggestion for decoration; in a decorative sense there is perhaps a little too much of the bunches or rolls of clouds. Some of the figures which may come under the class of "Facts," are in part studies of costume effects, such as "Carmen" (9), and "Folly" (3), the latter a very clever sketch of a masked girl in a fantastic male costume, though not free from a touch of vulgarity. Mr. Sainton is a capital draughtsman, but his colour is rather showy and inharmonious at times, and spoils his conceptions. Thus "A Pastoral Scene" (14), is far more attractive in its colourless form as an etching, in which it is a charming classic fancy; in the water-colour, it is spoiled by the disagreeable colour. In the same gallery are exhibited a collection of water-colour drawings in India and Egypt, by Mr. Reginald Barratt, which ought to interest architects. They are chiefly of architecture, which Mr. Barratt treats with forcible colour and correct and careful drawing. Some of the drawings of the Cairo Mosques are especially good, the Toloon Mosque (33) is admirable. The Indian subjects include a good many buildings well-known to fame, with other very interesting bits which are not in the books. At Messrs. Dowdeswell's are some "Studies in English Weather," small water-colour sketches of landscape effects, by Mr. J. H. V. Fisher, some of which are interesting, and a rather larger and more multifarious collection of figure and landscape studies, by Mr. Frank Richards.

THE death of Mr. P. G. Hamerton, recorded in another column, is a great loss to the world of Art and Letters, for he was a writer who combined a great charm and individuality of literary style with a keen insight into art. His early intention was to be a painter, and in "A Painter's Camp in the Highlands" (1862) he gave a graphic description of his experiences in the cabin which he had built in the midst of a moor, to watch and study minutely the effect of the landscape under all conditions of light and weather. In spite of this genuine and earnest application, he entirely failed as a painter, and even in his invaluable book on etching the only weak points are the few of his own etchings introduced. But as a writer he has thrown great light on Art; he had the power of imparting to others his own enthusiasm, and he hardly wrote a sentence which was not interesting from the writer's earnestness and his picturesque literary style combined. For many years he edited the *Portfolio*. Among others of his works may be named the life of Turner, for the French series of "Artistes Célèbres" (1889);

"Paris in Old and Present Times"; "The Graphic Arts" (1882); "Round my House," notes on conditions of rural life in France (1876); and "French and English," one of the best and most true and comprehensive comparisons of English and French life and character that has ever been made, and well calculated to help each nation to understand the other. As an Englishman resident for many years in France, he had peculiar opportunities for making such a comparison. As a contemporary writer on art he comes next in literary force to Ruskin, and his judgments are a good deal more reliable.

## THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

### PRESIDENT'S ADDRESS.

THE opening meeting of the members of the Royal Institute of British Architects for the present Session was held on Monday last, at 9, Conduit-street, Mr. F. C. Penrose, F.R.S. (President), in the chair.

The President announced that at the Statutory Examination held in October a certificate of competency to act as District Surveyor under Local Authorities had been granted to Mr. F. B. Andrews (Associate), of Birmingham.

Mr. W. H. White (Secretary) announced that the following gentlemen had been admitted to candidature:—As Fellow: Edward Ingress Bell, of London (Associate); as Associates: Walter H. Baker, Wrexham; Eustace G. Bird, Ontario; Harry Jefferis, Haverstock Hill; Robert J. Thomson, Furnival's Inn; Alfred W. Toynton, Bloomsbury; Harry Harrington, Royal-avenue, S.W.; as Hon. Associates: Alfred Gilbert, R.A., Maida Vale; W. B. Richmond, A.R.A., Hammersmith; F. G. Hilton Price, Director of the Society of Antiquaries; as Hon. Corresponding Members: Emerich Steindl, Professor of Architecture (Medieval) in the Royal Polytechnic, Architect of the Houses of Parliament, Budapest; Alois Hausmann, Professor of Architecture in the Royal Polytechnic School, and Architect of the Royal Hungarian Court Palace, &c., Budapest; Charles Buls, Burgomaster of Brussels; Henri Edouard Naville, D.Ph., D.Litt., *Correspondant* of the Institut de France, Dalguy, near Geneva; Barr Ferree, B.Sc., University of Pennsylvania, New York.

The President then delivered the following address:—

In the Opening Address of the President in former years you have naturally expected, and have not been disappointed in receiving, a general account of the state of the Institute and of its undertakings, especially during the interval which had elapsed since the previous Annual Address. One of the subjects dealt with in the last Address concerned the commencement and the early stages of the *Journal*. Now, however, the *Journal*, which has become a great success, stands in no need of Presidential encouragement, so that it is neither necessary for me to say anything in its favour—unless it be to thank those engaged upon it for the great trouble they have bestowed upon the work; nor is it necessary for me to dilate upon the affairs of the Institute, which are chronicled in its pages both more freshly and better than I could hope to tell them. A few points only seem to invite mention. I think I may say, without any exaggeration, that the Institute has continued to gain both in position and influence. As to the gain in members, without reckoning most welcome support given us by the allied societies, if we compare the numbers, I will not say sixty years ago—a date of which we were most agreeably reminded in July last—but taking fifty years ago, the increase is remarkable enough to be worth mention. The class of Fellows numbered at that time but little over 100; there are now more than 600. There were then some eighty Associates only; now there are nearly 900—and this notwithstanding the barrier which has been surmounted by most of the later members—namely, the Examination.

I think it is now generally recognised that the Examination in Architecture has fully justified its establishment; at any rate, it has become a great fact. And it seems important for me to call attention to this point—namely, that the present month brings the former and partly tentative arrangement to a close, and from henceforward begins the system of progressive examinations, the details of which will be found fully set forth in the recently-issued Kalendar. I consider that these

examinations cannot but have an excellent effect—first, and directly, in securing to our future members the reputation of having satisfied a certain standard of proficiency; secondly, and indirectly, by excluding from the Institute in the first instance, and by reaction from the profession at large, young men whose abilities would be more advantageously directed towards the pursuit of some other calling. Some excellent remarks on this head have lately been made by the President of the Architectural Association in his inaugural address to that body. A summary of the examinations of the past official year gives the following results, namely:—

(1).—In the Preliminary Examination 165 attended. Only 1 was "plucked," 28 were relegated for a term, and 136 passed.

(2).—In the Intermediate Examination 55 attended. Not one was rejected, 19 were relegated for periods, and 36 passed.

(3).—In the Qualifying Examination 176 applied, but only 150 attended. Three were rejected, 84 were relegated for periods, and 63 passed.

We welcome also the signs of useful examinations in building construction inaugurated by other bodies. The revived Guild action of the City Companies—to use the term applied to it by Mr. George Shaw, late Master of the Worshipful Company of Plumbers—is a circumstance favourable to sound execution. I have had pleasure in following in the steps of your former President in assisting at examinations conducted by the Worshipful Company of Carpenters.

I cannot leave this subject of membership without reminding you that the Charter declares the Institute to consist of "three classes of subscribing members, namely, Fellows, Associates, and Honorary Associates"; and though both the Fellows and Associates are steadily increasing in numbers, the Honorary Associates have been allowed to dwindle from 115 in 1878 to 60 in 1894, a decrease of nearly half—due, I am inclined to think, to a misunderstanding of the objects and principle which dictated the establishment in 1877 of this class of members. Honorary Associates are defined in our Charter as "persons not professionally engaged in practice as architects," but "who, by reason of their position or of their eminence in art, science, or literature, or their experience in matters relating to architecture, may 'render assistance in promoting the objects of the Royal Institute';" and a by-law fixes the annual subscription of an Honorary Associate at a minimum of two guineas, with an entrance contribution of two guineas, which is paid forthwith into the Library Fund. Now some have thought that under such circumstances the title of Honorary Associate is anomalous, because the term "honorary" should imply that such member is not a subscriber, and therefore no efforts are made to increase this class of members; but the term "honorary" ought not to be defined in so exclusive a sense. The French Royal Academy of Architecture, founded in 1671 by Colbert, consisted of three classes of members: Academicians, who were architects; Honorary Associates ("Les Honoraires Associés Libres"), who, without professing architecture, were distinguished by their knowledge of art or those relating to it; and of Associates or correspondents, both native and foreign. The title "honoraire" was used in the sense of our word "lay," or of the French word "libre," and it is in that sense we define it, and according to its true etymology, in the sense of conferring honour. The words of admission of Honorary Fellows in our universities are "*In honoris causâ*." Moreover, we do not look upon our Honorary Associates as merely ornamental appendages who give us the encouragement and honour of their names, but are not expected to take any part in our proceedings. They form part of the electorate, and have the power of voting for the Council and the Standing Committees, and at the general meetings on all matters except professional points and the admission of candidates, and we look to them for helping to spread a knowledge of architecture among all classes of the educated community. I am convinced that the development of this class of non-professional members will greatly enhance the usefulness of the Institute. We should wish to enrol in our Honorary Associate class many more painters than are now in its ranks, a large number of sculptors, engineers at home and abroad, the masters of the great crafts, and the more prominent of those thinkers and workers who, by their books and discourses, disseminate love and respect for the several arts and sciences of which the embodiment is architecture.

There is another section of membership of the



Institute, pertaining to the non-subscribing classes, which has always seemed to me to form an essentially important part of corporations such as ours—I mean the class of Corresponding Member, or Foreign Correspondent. At present the majority of such members is distributed over France, Germany, and Italy. We have two in Denmark, two in Sweden, two in Spain and Portugal, two in Greece and Turkey, three in Austria, four in the United States of America, five in Belgium and Holland. Now I want to see Austria and Hungary largely represented in our ranks; and it is gratifying to know that two of the most distinguished architects of Budapest—a magnificent city of which too little is known in this country—are nominated for election. I should be glad also to see Austria at least as fully represented among us as Italy is; and I hope that the increasing popularity of Spain as a resort for study among the students of the Institute may lead to an exchange of ideas, a reciprocity of knowledge, between the architects and students of the respective countries. Most, if not all, of the greatest European architects and archaeologists have been correspondents of our body, and even in 1842 they were fifty-five in number; while at present, after the lapse of half a century more or less prosperous, we have only forty-nine. But, worse, a startling omission occurs in this list: the architects, archaeologists, and similarly learned men of Russia are absolutely without a representative among us. A few years ago we possessed Constantine Thon, Professor Strohm, and Professor Resanoff, and in 1842 there was Alexander Bruloff, of the St. Petersburg Academy of Fine Arts. Some attempt, I think, should be made to renew the ties of confraternal association which have existed, and which ought always to exist, between the architects of the mighty Russian Empire and ourselves. There never was a moment when such a reunion could be attempted with more chance of success than now. Indeed, Lord Rosebery—who, in the patriotic speech he delivered in Sheffield at the Centenary Feast, in which I had the honour to participate as your representative, expressed the unanimous feeling of this country toward the dying Tsar—cannot desire to retain relations of friendship with the whole population of Russia more heartily than we do with that small portion of it composing our own profession. Whilst recalling my visit to Sheffield, I must not omit to mention the kind reception I met with there from the members of our allied society.

#### *The London Building Act, 1894.*

I have almost completed the observations I wished to make upon what may be termed the personal affairs of the Institute. But there is one point to which I think your attention should be directed. I allude to the present position of District Surveyors in London.

A new Metropolitan Building Act has passed the Legislature, with so many new provisions that it seems to require much study on the part of those who have to enforce it as District Surveyors or to obey it as architects. For some of the enactments, at any rate, we may be thankful; I refer particularly to those which impose limits—lofty enough, indeed, but still limits—to the height to which houses may be carried both in front and back. For amendments in many provisions of the new Act, made after long and careful consideration, the Metropolis is largely indebted to our Practice Standing Committee, as also to Mr. Arthur Cates, Mr. Rickman, and Mr. Edwin T. Hall, who, with representatives from the Surveyors' Institution, attended a prolonged conference on parts of the original Bill with the London County Council. I will not, however, enter into the subject further—indeed, it would be premature to do so, as the Building Act is only just published. Valuable comments on leading points have already appeared in the building journals. An abstract of the Act is being prepared by our Fellow, Professor Banister Fletcher, and will be published in a few weeks, and I have more recently learnt that another work of the same kind, by Mr. H. H. Statham, is expected to be published at the end of the present week. Under this measure—the London Building Act, 1894—which comes into force on the first day of next year, the Institute still remains the examining body for granting certificates of competency, without which no person can become a candidate for the office of District Surveyor in London. This statutory examination, until the present County Council imposed a condition that a District Surveyor shall not practise as an architect, was always well attended, and those who presented themselves for examination were generally men who had not only received the education of an architect, but had practised as such. Not long ago this statutory examination

was held quarterly, and the Examining Board had then much to do in order to finish the oral part of the examination on one day. But now, very few persons apply to be examined, and during the last official year the two examinations announced to be held did not take place, owing to the want, or perhaps the paucity, of candidates. Yet a District Surveyor, if he is to do his duty by the London Council who appoint him, as well as by the architects whose buildings he has to inspect, should have that knowledge of architectural science or building which can only be acquired by an architect who has been engaged for, say, seven or ten years in the active practice of his profession.\* I will not go into the question whether a District Surveyor ought or ought not to be allowed the right of private practice, but I am certain that he ought to have practised as an architect before attempting to fulfil the duties of a District Surveyor under the London Building Act. Is there, then, anything unreasonable in the thought that the London County Council would be wise in including among the conditions of such appointments the proviso that every candidate for the office of District Surveyor in London shall have previously qualified for admission to the class of Associates of this Institute, and have either passed thence to the class of Fellows or have become admissible, by length of practice, to that class?

#### *Three Thames Bridges.*

We have lately seen brought to completion by our Honorary Associate, Mr. Wolfe Barry, a great engineering work with which the late Sir Horace Jones was originally associated as architect. If he had lived to superintend the completion of the design of such parts of it as lay in his department, he would, probably, have left the towers more massive than they are. It is, indeed, greatly to be wished that association between architects and engineers, in cases where their provinces overlap, were more frequent than it is. I well remember Professor Cockerell regretting a lost opportunity of the kind in the case of Waterloo Bridge. Sir Robert Smirke had offered his assistance to Mr. Rennie in profiling and adjusting the Doric columns which formed part of the engineer's design; but the latter declined. The baldness of those columns is a serious defect to the beauty of the bridge, which, indeed, would have been handsomer if the columns had been omitted altogether; and one of the good results of the Tower Bridge is that it relieves the necessity of tampering with the noble simplicity of London Bridge.

#### *The Wembley Park Tower, &c.*

In contradistinction to works which are satisfactory for their actual or hoped-for achievement, I feel called upon to mention one, of which the stoppage would, it seems to me, be matter for congratulation; and to express the hope that no further progress may be made with it, unless it be to convert what already has been done into something far less pretentious than the original intention, calculated to spoil the scale of everything else for miles around it. I need not explain to anyone here present that I refer to the incipient structure of the huge steel tower at Wembley Park in the north of London. Possibly, if its lower story were turned into something of the nature of the hanging gardens of Babylon, it might be an interesting and unobjectionable structure; but if the original scheme is to be carried through, you will, I think, agree with me in wishing confusion to a new Tower of Babel.

Again, with regard to another point, which is not, I fear, so much attended to as it ought to be. It cannot be too strongly insisted upon that in the case of old buildings of established architectural merit, when new buildings are erected by their side, the utmost care should be taken that the new works do not injure the effect of the older. I think many of us must have been often much pained in witnessing such injurious treatment of old venerated monuments. I am particularly thinking of the case which I lamented, namely, the new buildings of King's College abutting with such small consideration against Somerset House, notwithstanding the most laudable attempt of our Council to prevent its being done. Another case of the kind has occurred, but not so recently, at Exeter. There was, till comparatively lately, as in the case of several of

our cathedrals, immediately contiguous to the west front of Exeter Cathedral, a small church of no remarkable architectural value certainly, but which by its very smallness gave valuable scale to the cathedral. At a later visit I found it had been replaced by a church of much larger proportions, and the merit with reference to the cathedral which its predecessor had was entirely lost. In my opinion, though the wants of the parish may have required the enlargement of the church, there was no occasion for the architect to have so raised the tower and spire as to overtop the venerable cathedral.

#### *Architecture: a Profession or an Art?*

I shall not attempt to meddle with the controversy which some time since was raised as to whether architecture is an art or a business. The two elements are no more separable than are faith and works; and our teaching to students properly takes cognisance of both. To the Art element, and the thoughts more immediately connected with it, I propose to confine myself in what I have still to say to-night.

#### *The Threatened Destruction of Phile the Beautiful.*

The original sources from which we derive our art must always have an intense interest for us, and whilst we are in hopeful expectation of new light being thrown upon Greek archaeology from the researches of the French architects at Delphi, under the experienced and skilful guidance of M. Homolle, the Director of the French School at Athens, we are not indifferent to grievous tidings which come from Egypt—a strange proposal which, having been more or less vaguely in the air for some time, has recently assumed alarming consistency. I refer to the proposed Nile barrier, to be built across the river at Assouan for the purpose of storing up the waste waters of the annual inundation in a huge reservoir, in such a manner as to submerge and ruin a series of the most beautiful and interesting remains in the country. The *Journal* has contained two or three valuable papers on the scheme, particularly one by M. Naville in the August number, but the subject is so important and interesting that it seems to demand some mention here. The deluge which is threatened would extend from Assouan as far as Korosko, a distance of fully one hundred miles, forming a lake of which there would be no parallel in Europe, submerging the Island of Phile, with its celebrated group of temples of the highest beauty and artistic value, and eleven or twelve other important sites, particularly the fine and very perfect temple at Kalabsha. In addition, moreover, to what we know would be lost, it should be noticed that, as the region of Nubia in which they occur has not been so carefully examined as most other parts of ancient Egypt, it is more than probable that many objects which would otherwise reward future exploration if they remained, as now, accessible, would be lost for ever. Again, if anything happened to the dam, what would be the fate of Lower Egypt, and all its inhabitants and all its treasures? We need not fear but that the engineers would do their best to make it secure; but sad instances of the failure of reservoir dams, where everything ought to have been well constructed, are not unknown to us, and the region has been subject to earthquakes so violent as to throw down even Egyptian structures.

The proposal has, unluckily for one point of view, much that is tempting to utilitarian minds, and we are not, as a nation, exempt from the reproach of yielding in cases where men of business have had to choose between sentiment and prospective gain. In the case of the Nile barrage, we must do the Egyptian Government the justice to say that they would seem to deplore the injury to Art and History which would follow; but the premium which is held before them is so large that we may feel sure that any attempt to oppose an absolute negative to the scheme would be simply futile; nor would it be right. Our own Government, again, is doubtless in no enviable position in the matter. If by an exercise of power we were to prevent the work from being undertaken, it is easy to see what a deep, and maybe dangerous feeling of disappointment would arise in Egypt; whilst, if they consent to it, our rulers, both at home and abroad, would incur much obloquy. As for the Island of Phile, it is true that a scheme has been proposed for lifting up the remains above the surface of the reservoir; but it can hardly have been proposed seriously. It would be ruinously expensive to do it at all adequately, and would quite destroy the value of remains now perfectly adapted to the island on which they stand. Practically, the attempt, if made, could not fail to be worse than sub-

\* These remarks surely cannot be applicable to the future position of District Surveyors. At a survey, there is not the slightest hint in the new Building Act about forbidding the District Surveyor to practise as an architect; in fact, there is a special section (114) to meet the case when a District Surveyor has to deal with a building erected by himself in the course of his private practice. The "Superintending Architect" is forbidden to practise, but not the District Surveyors.—Ed.



mergence. It has been also suggested that a dam of less elevation, placed above instead of below the Island of Philæ, would for a long time answer all legitimate demands for water storage, and would involve a much smaller sacrifice of valuable antiquities or disturbance of inhabitants; and if at some future time the demand should arise for a larger supply, other means not now available—new sites, for instance, above Wady Halfa—might be found. We may, at least, hope for the escape of Philæ and some other of the Nubian antiquities, and this gradual method of procedure would seem to fit in with the expectations of the proposers of the barrage, for the supposed profits on which the scheme is based are not to flow in at once, but, as Mr. Garstin, Under-Secretary of State for Public Works in Egypt, himself says, the *great expectations* are founded on an eventual increase "which it will take years to arrive at." On this subject I would draw your attention to a pamphlet printed by the Society for the Preservation of the Monuments of Ancient Egypt, in which a more gradual method of water-storage is strongly advocated.

As regards the main proposal of this barrage, we have, indeed, no resource but hope; and in this I am encouraged by the remarks of our distinguished Honorary Associate, Sir John Fowler, who presided at a recent meeting of the Egypt Exploration Fund, when he took occasion to state that there was now little danger of the destruction of Philæ; that further inquiry had shown that the material necessities of Egypt and the claims of archaeology were capable of reconciliation. There is, however, another aim; which we need not relegate to the transcendent, but also transcendental, virtue of Hope. And towards this you have taken a valuable step by appointing, through your Council, delegates to a conference in which the Royal Society, the Society of Antiquaries, the Society of Dilettanti, and the Hellenic Society and others, are represented, for considering the best manner of instituting a thorough survey, architectural, archaeological, geological, and physical, of the district the submergence of which has been threatened. This conference was initiated by the Society for the Preservation of the Monuments of Ancient Egypt.

#### *Old and New Methods of Design and Practice.*

Turning homewards, it may be useful to institute a comparison between some of the results of architectural work of the present, as compared with an earlier period in this country. In making this comparison we must not lose sight of the great differences in the two periods, both in respect of the demands upon the architect and of the materials available to his hand. The greater complexity of the conditions of modern life is unfavourable to the modern architect in some respects. It requires him to spend a large portion of the funds available for a building in work which, however important, can produce no æsthetic effect, and the many calls upon him to satisfy a variety of wants must necessarily make it very difficult to secure that charm of simplicity and proportion which is an essential ingredient in work of the highest quality; indeed, with so many importunate claimants for attention, the time which must have been devoted to rhythm and harmony by the older architects can now seldom be spared. There is, therefore, a great temptation to accept a premature solution of the problem, provided the requirements of the plan appear to be satisfied, and provided the resultant grouping, however haphazard it may be, accords with some ideal of picturesqueness which natural or acquired taste can generally secure. I do not, however, venture greatly to blame this result. It is far better that a good plan should command the obedience of the elevation than that a preconceived symmetrical elevation should force the plan into inconvenience. Nevertheless, a more excellent way is almost always possible where the plan shall still rule, but with all the difference between marching order and broken ranks; and, as I said, it may require more time for working out than can be spared in any particular case. Genius has been defined as the power of indefatigable study. Such genius is indeed very necessary for the highest achievements of architecture. There are certain buildings, such as club-houses, theatres, town-halls, and, above all, ecclesiastical structures, which lend themselves much more than others to be treated by the rules of Art; but there are none, not even the most humble, which may not be improved through study with an eye that loves proportion. It is a duty the profession owes to the public to do this on every possible occasion.

To return to my comparison between the older and later architectural works. There is a point which seems to be deserving of attention, but

whether it admits of being to any great extent brought into operation I do not venture to say. The modern architect, owing to the way in which drawings, specifications, and bills of quantities are prepared, and the exactness with which contract works are expected to follow out those documents, has seldom if ever the same freedom in studying his design as it develops itself, and in making improvements which suggest themselves as the work goes on, that our predecessors had two hundred years ago. The designs made by Sir Christopher Wren for St. Paul's Cathedral underwent great changes during the progress of the building, as there are many extant working drawings to show. Some liberty, of course, we have by the usual conditions of contract, but the greater rapidity of modern construction, and the fear of additional cost to the employer, limit considerably the free use of these conditions; and this want of elasticity, so to speak, in availing ourselves of opportunities offered by the study of our works whilst in progress is one of the points on which the older architects had a great advantage over us.

#### *A Permanent Gallery of British Architecture.*

Let us now compare the works of some of the older with those of more recent architects. But before doing so I would urge upon those in whose hands rests the power of developing the means of architectural study to consider the possibility of forming a permanent exhibition of drawings representative of English architecture. The suggestion, indeed, is not new, nor is it mine; but I have received a letter on the subject from our Fellow, Mr. W. Howard Seth-Smith, which is so much to the point that I propose to read a portion of it. He says:

"If we are to look for real and permanent progress in architectural design, we must in some way create public interest and enthusiasm for beautiful building. A permanent exhibition would be the very best means of gaining public interest in our art. It is the galleries which have made art more popular. It may be true that the public do not understand geometrical drawings such as are annually exhibited for three months in one small room at Burlington House, but there is a very considerable and increasing number of persons sufficiently interested in architecture to appreciate buildings if represented by photographs and other perspective views.

It is on the face of it unfair to subject an exhibition of architectural design (largely geometrical) to competition with a mass of popular pictures, as is the case at the Royal Academy; but this is the only opportunity existing in London for a person to watch the progress of English Architecture. While the amateur opportunities are confined to the ancient buildings themselves, his prejudice against all modern work is likely to be as invincible as it is unreasonable, and therefore fatal to progress. Nor is he, as a rule, capable of studying modern work profitably by perambulating the streets; his knowledge will be too small to enable him to discern the good from the bad. The choice specimens (alone worth the attention of the student) are, with few exceptions, scattered too widely or hidden too deeply amid this utilitarian wilderness of London to make this practicable.

I would propose that a permanent exhibition be organised of most carefully-chosen architectural illustrations of the best ancient and modern designs, classified under all the great divisions of building, such as Civil, Ecclesiastical, Domestic, Scholastic, &c. There should be one department for photographs of selected ancient work, chronologically, and topographically arranged and carefully described. This would supply the urgent and often-expressed want of an illustrated lesson on the characteristics and developments of the great architectural epochs and styles of the past.

Such an exhibition would at once be popular among the rapidly-extending connoisseurs of art, would be patronised by persons of enterprise and intelligence desiring to build, and would doubtless be largely visited by Americans and other foreigners."

I certainly consider Mr. Seth-Smith's proposal one of great importance. To be of any service it would require to be carried out in an effective manner, and if this could be done, it could not fail to be advantageous both to our profession and the public at large.

Returning to my proposition before stated, the list of the architects I propose to refer to begins with the two greatest names on our record, namely, Inigo Jones, who practised in the reigns of James I. and Charles I., and Sir Christopher Wren, who practised in those of Charles II., James II., William and Mary, and Queen Anne.

#### *Inigo Jones.*

Inigo Jones had settled at Copenhagen, and the King of Denmark's sister, who married our James I., brought him back to his native country. He then travelled for further study in

Italy. The beautiful fragment at Whitehall is, as you know, only a small portion of the magnificent palace which he designed for King James, preserved to us, no doubt by the liberality of Lord Burlington, in Kent's fine edition of Inigo Jones's works. Besides the Banqueting House, there are but comparatively few remains of Inigo Jones's buildings in London. We have lately lost a very interesting work of his in Lord Shaftesbury's house in Aldersgate-street, which was taken down about ten years ago. It had already suffered much, but was still a noble fragment. There is also the much-mutilated east front of St. Paul's, Covent Garden, and the Piazza on the north side of the market; and there is the Water-gate at the bottom of Buckingham-street. This gate, although it retains its beautiful proportions, has lost much of its interest, now that it no longer gives access to the river; but its preservation under any circumstances is a thing to be grateful for. A house on the west side of Lincoln's Inn Fields still shows the handiwork of Inigo Jones. Ashburnham House, Little Dean's Yard, Westminster, built by him, has been much altered, but there are remains of his work in the interior. There are probably a few others, but a good deal has been attributed to him on insufficient grounds.

#### *Wren's Principal Works.*

Sir Christopher Wren's first work of any importance was the Sheldonian Theatre, Oxford, designed by him in 1664—a building which still admirably answers the purpose for which it was constructed. At this time Wren was busied with various designs for altering old St. Paul's, which had survived in a very ruinous condition the ill-treatment of the sixteenth century and of the Commonwealth. The Great Fire in 1666 put an end to all attempts to repair and alter it, and made a new building necessary. I am not intending to dilate upon the existing cathedral, which you all know so well, and in which there is so much to admire, but I should like to call your attention to a design which is even more distinctly Wren's than the existing cathedral. I refer to his first and favourite design, for which an elaborate and large scale model was prepared. This model still remains, though, unhappily, it suffered from neglect during many years, and I am glad to be able to inform you that it is undergoing restoration, though progress is necessarily slow. It is, however, in quite a sufficient state of preservation to enable Sir Christopher Wren's merit to be fully appreciated. We have here, by Mr. Goodchild's kindness, two splendid drawings representing the interior of the cathedral as it would have been if Wren had been allowed to execute this design. I do not say that it competes on equal terms externally with the existing structure, especially when we consider the height of the surrounding buildings, which gives the value of greater loftiness to the adopted design. But when we consider the two interiors, the balance altogether preponderates in preference of Wren's favourite design. As for certain defects in it, which Ferguson in his "History of Modern Architecture" discusses, we must remember that Wren had not, in the case of this design, as he had in the adopted one, thirty years of study and improvement to give to it as the work proceeded; but this marvellous production was the outcome of necessarily a very rapid incubation.

The late Rev. J. L. Petit, the exhibitor of whose splendid water-colour drawings at the Institute some of us may remember, in discussing Saint-Front, Périgueux, and what has been and still might be derived from it, observes that Wren—who, though he may not have known Saint-Front, must have known St. Mark's, Venice, from which Saint-Front was derived—"had conceived a design" (namely, this his favourite model) "on similar principles, which, had it been carried out, would have given his cathedral the noblest tier in the world." I commend the whole passage, and, indeed, the whole book to your study.

It is evident that Sir Christopher Wren's designs embodied the result of much study and many approximating revisions in preliminary sketches, carrying out in this the precept of Horace, "*Sæpe stylum certat*," which may be familiarly translated "Use your indiarubber freely"; and when the final result was attained, I believe we shall always find that he considered rhetorical proportions as essential to completeness in architectural design as they are to poetry. I find the same thing in the two buildings of Sir Christopher's I have chiefly studied—namely, St. Paul's Cathedral and St. Stephen's, Walbrook—and I have no doubt it obtains also in his



lovely creations of Bow steeple, St. Vedast, St. Martin's, Ludgate, and others of his works, which possess admirable qualities of elegance combined with simplicity.

#### *Wren's Pupils and Followers.*

The most conspicuous of Wren's followers were his pupil and assistant, Nicholas Hawksmoor, and Vanbrugh and Gibbs, to whom may be added, as an associate, Dean Aldrich, who built the church of All Saints, Oxford, and the Peckwater Court of Christ Church, in a style much in harmony with that of his friend, Sir Christopher Wren. The three first-named have left stately monuments. To mention only one work of each: Hawksmoor has given us, in his church of St. George, Bloomsbury, a monument worthy of the classical feeling he had imbibed from his master; James Gibbs, in his church of St. Mary-le-Strand, a work of great elegance, which I select from among his other buildings for the purpose of recording the gratitude due to our late President for the zeal and pains he displayed in its restoration a few years ago, when its demolition was threatened by the utilitarians of the day; and Vanbrugh at Castle Howard, a noble pile, more pure than Blenheim. Vanbrugh, however, failed to impart—as Wren did—sufficient elegance to his powerful masses.

The above-named architects represent in date the middle of the seventeenth and the dawn of the eighteenth century, and they are the authors of standard works with which it is hard for the modern schools to compete. The middle and end of the eighteenth century witnessed performances many of which were not wanting in dignity, but they offer a less uphill match to our own time.

We must, of course, accept a common ground of comparison; for Gothic architecture was almost unknown in the eighteenth century—though an exception to this statement ought to be made in the case of the architect, Essex. Limiting the inquiry, therefore, to the revived Classical styles, the names of Lord Burlington and his friend Kent, and Kent's pupils, Flitcroft and Vardi—the latter the builder of Spenser House, in the Green Park—the younger Dance, Sir William Chambers, and James Gandon, the architect to the Four-courts in Dublin, and distinguished as being the first to receive the architectural gold medal of the Royal Academy, stand out pre-eminently. There is a simplicity and fitness for its purpose about Dance's principal works, Newgate and St. Luke's Hospital, which are worthy of being carefully noted. Sir William Chambers's great work, Somerset House, notwithstanding many effective new buildings on the Embankment, maintains its pre-eminence, and the Strand front and entrance may still be said to "hold the record" of similar combinations.

A little later in the century lived Wood, the architect of Bath, whose palatial building of Prior Park is one of the ornaments of the eighteenth century; and James Wyatt, a man of versatile genius, and Robert Adam, have left works of merit. At the turn of the century came Sir John Soane, whose most remarkable design, the Bank of England, has the merit of being thoroughly characteristic of the purpose of the building, following in this the spirit of his master, the younger Dance.

#### *The British Architects of this Century.*

When we come down to more recent times, by which I mean the first quarter of the present century, I find among the names of the architects some whom I myself remember when I settled in London as a pupil to Edward Blore in 1836. One of my first memories was the exhibition of the designs for the new Parliament Houses. They were exhibited in the rooms in Trafalgar-square, which had only lately been completed and had not yet been assigned to the Royal Academy, whose exhibition for that year was still held at Somerset House. Sir Charles Barry's design was approached by no rival. Some drawings were, indeed, sent in by Cockerell, but he had evidently not entered seriously into the struggle. Blore did not compete. So far as my judgment at that time can be trusted, the best of the unsuccessful designs was by Basevi. Besides the four just mentioned, the names I recall as the leading London architects were Samuel Angell, Tite, Hardwick, Sydney Smirke, Donaldson, Salvin; and, as a writer, Gwilt. For Sir John Soane, Sir Robert Smirke, Wilkins, Inwood, and Decimus Burton, though living, belonged to an earlier decade; Thomas Henry Wyatt, Sir George Gilbert Scott, and Sir James Pennethorne had scarcely at that time made their mark; and

William Burn was just migrating to London from Scotland. I omit Augustus Welby Northmore Pugin, who, as far as the competition for the Parliament Houses was concerned, was, as it was already known, giving his assistance to Barry.

At the time to which I refer, I consider that, with the exception of Pugin, Blore was the only architect who was quite at home in the detail of Gothic architecture. The full development of the Revival had not come in, and it was the "day of small things;" but whilst we may reasonably complain of a want of massiveness for the most part in his works, there is a sense of elegance about his buildings which raises them above the level of the majority of the contemporary works of Gothic revival. There are not many of his buildings in London. The exterior of the Church of St. Thomas Charterhouse, in Goswell-road, may be cited as a good specimen, allowance being made for the decay of the Bath stone used in the decorative parts, the inability of which material to resist the London atmosphere was not so fully recognised then as it has been since.

Among the best buildings of the same period are two works by Shaw—the hall of Christ's Hospital and the tower of St. Dunstan-in-the-West; fortunately a better stone was used in their construction.

The first place in the period which I am considering—for I purposely do not refer to the names of men who, like William Burgess and George Edmund Street, attained such distinction during the second half of this century—must be assigned to Sir Charles Barry, not only on account of his great work, the Parliament Houses, in which, whatever amount of freedom in detail he may have allowed to his coadjutor Pugin, his great power of dealing with the masses was conspicuously his own. But independently of this, the Reform and Travellers' Clubs and Bridge-water House, to mention no other of his works, suffice to secure him this position. Barry was a man of extraordinary energy, of unwearied industry, and of powerful presence, qualities of the utmost importance to anyone engaged in works of such a scale as those which were intrusted to him, especially when combined with a courteous manner, of which I personally had the highest appreciation when he was on the Committee assisting Dean Milman in the works intended for the completion of St. Paul's Cathedral.

The man of greatest distinction after Sir Charles Barry was unquestionably Professor Cockerell, a name deservedly revered and honoured, whose buildings include some of very great merit. Cockerell laid the foundation of the classical expression found in his works by an exhaustive study of Greek remains, of which he was an eminent and ardent explorer, in days when such investigations were rare, and attended often with "perils from waters and with perils from robbers," in days when communications were very difficult. His fame would be considerable if it rested only on his published works. When he returned to England he entered heartily into the then fashionable Greek revival; and, so far as it was possible to adapt the limited range, not of its teaching, but of its available precedents, to modern practice, he succeeded—a claim which can be made for no other architect of our time but one, Schinkel of Berlin.

Cockerell excelled as a draughtsman, and was no mean sculptor. He himself modelled much of the ornament which he introduced into his works, and his mouldings are always examples of appropriate profile. These details, and the propriety of their subordination to the whole, in addition to the sense of harmony and proportion which prevails throughout, are objects particularly worthy of study in his works. In London the Sun Fire Office near the Bank of England, and at Oxford the Taylor Museum, are buildings which will preserve his reputation as an architect. His lovable nature—

"Not being less but more than all  
The gentleness he seemed to be—"

is still dominant in the remembrance of those who had the privilege to know him, but their number is now greatly reduced. There are, however, not wanting here those who can remember his son, which will help them in imagining what the father must have been. His admirable lectures delivered at the Royal Academy cannot but have produced good results on those who heard them. Both in Cockerell's works and in those of Barry will be found the same qualities of proportion and subordination of ornament which are conspicuous in the works of Sir Christopher Wren and architects of his school.

Nearly contemporary with Cockerell as a

Greek explorer was Donaldson, the chief pillar of the Institute at its commencement. There is not much of executed building by him to which I need draw your attention, but he was an admirable instructor; and many of our present members owe much to him from his lectures at University College. He, too, has left a long-enduring memory of a kind and sympathising nature; and, while mentioning Donaldson, I cannot but refer to the three Papworths, father and sons, the last of whom has been borne to his grave since we met in this room. The names of John and Wyatt Papworth, devoted supporters and benefactors of the Institute, must always be associated with its library; and that of the younger of the two with "The Dictionary of Architecture," for which he was a laborious worker, and the completion of which he, as its editor, happily lived to witness. I shall ask you presently, colleagues and gentlemen, to cause to be recorded upon the minutes of this meeting our sense of the loss sustained by the death of Wyatt Papworth.

To continue: Gandy Deering, himself a Greek explorer, having been engaged in that service by the Society of Dilettanti, exhibited much skill in his use of Greek elements; but for the most part the Greek revival did not, and could not, succeed, and it helped to bring on the Gothic revival, which apparently is also losing its vitality. Some good works, in which Greek detail is not so evident, were, however, produced about the same time, such as Arthur's Clubhouse, and Basevi's Fitzwilliam Museum at Cambridge—the latter being left unfinished when Basevi met his death by a sad accident in Ely Cathedral. The building was then completed by Cockerell, but the interior has been much altered since those days.

The most remarkable building of this period (if we exclude the Houses of Parliament, the style of which does not lend itself to the comparison) is St. George's Hall, Liverpool. The younger Elmes, who was the architect, did not live to finish the building; and after some delay Cockerell was appointed to complete the work. It appears that Elmes had left full instructions for its completion, so that these documents had been lost or mislaid, so that when Cockerell came upon the work he had nothing to guide him but the shell of the building. The entire finishings as executed are by Cockerell's hand; but there can be no doubt that in every respect he loyally carried out Elmes's intentions so far as they could be gathered, and the harmonious result shows that he must have succeeded in practically doing so. The external approaches to the Hall were worked out and finished with great care by Cockerell; these, however, have been since subjected to considerable alteration by others.

#### *Proportion in Preference to Picturesqueness.*

I have now carried the summary far enough, and shall not particularise any very recent buildings; and for the purpose in view—that is, the comparison of what was done in the seventeenth and eighteenth centuries with the works of the present time—there is no necessity for my doing so. Carried down to the extent it has been, we have found in Sir Charles Barry's and Professor Cockerell's works the same loyalty to the principles of subordination and proportion that prevailed in the days of Inigo Jones and Wren. But, latterly, they seem to have been too much lost sight of. Both the Greek and Gothic revivals have had the effect of bringing into contempt the precedents of Palladio and the great Italian authorities; and, misinterpreted as the spirit of their rules often was, there was some reason in this reaction, for, as far as such rules were supposed to supply the place of genius and thought, they were indeed fetters instead of helpers. That genius and thought could be replaced by rules of any kind was certainly a mistaken view. Followed as Palladian precedents and principles were by men like Inigo Jones, Wren, and Chambers, as the language with which their thoughts were to be clothed, they had the same value in architecture that metre has in poetry. The licence which is now too frequently taken with forms and features long recognised as essential, in favour of a treatment of which the final aim is picturesqueness, can hardly ever produce a satisfactory effect from all points of view. I do not hesitate, however, to allow that pleasing effects do, as it were, accidentally occur; and that we do not, in streets where architects have scope allowed them, see monotonous frontages of the class of Gower-street and Wimpole-street—such as were general at the beginning of the century, though even to them some excuse must be granted. Those were hard times, when the country was struggling in a great war for very



life, and severe economy in building was then much more insisted upon than it has been of late; and had that restriction not happily been relieved, there could not have been employment for more than about one-tenth of the number who are at present enrolled in the profession. The relaxation of architectural discipline, however, was not a necessary element in the result referred to, for quite sufficient variety, and of a better quality, can be obtained by proper study without ignoring accepted precedents, or neglecting principles of still greater value—namely, proportional relations of contiguous parts and subordination of details to the purposes for which they serve and to the general effect. My predecessor in this chair insisted so well and so emphatically on the evil of redundant ornamentation, which has been common of late, that I should only weaken what he so well urged, were I to say more than that I heartily agree with every word he uttered on the subject in his last Annual Address to the Institute.

The Rev. Robert Gregory, Dean of St. Paul's, said he had great pleasure in proposing a vote of thanks to Mr. Penrose for his very interesting address. Were he (the Dean), a professional architect, he might venture to criticise some of the things that had been said, but as a layman, from the architectural point of view, he did not profess to be in the slightest degree qualified to do anything of the kind. But, at the same time, he might refer to some of the points raised by the President. In the first place, he would congratulate the Institute on the rapid increase in its numbers. The profession of an architect must either be a very flourishing one owing to the enormous number of buildings, or the average amount of emolument gained by each architect must be rather limited. A vast number of the buildings erected had no thought whatever of beauty bestowed upon them, the only idea of the people who had them built being to see how much money could be made out of them. In London they were a good deal handicapped by the enormous value of pieces of land, which increased the cost of the buildings erected upon them. Possibly the profession of an architect might come to be a good deal like that profession of which he had the honour to be a member, where there was employment for any number of people, but a livelihood for very few of them. Another remark made by Mr. Penrose, which was worthy of serious consideration, was as to the large sums of money which had often to be expended upon works that did not appear. His experience of architecture for some time past had been to a considerable extent connected with drains, and he found that a number of architects did not look after the drains until they had been constructed, while the reconstruction of such necessary portions of work, if houses were to be healthy, was a very costly operation. In the older part of London—the City—there had been a complete revision of the whole question of drains, consequently an enormous amount of cost had been put upon those living in houses where the whole thing had to be reconstructed. He had learned that the inspection of buildings by the County Council, and the persons authorised by them, did not appear to be carried out in the happiest way possible. The District Surveyors frequently seemed to be lacking in that amount of practical knowledge and appreciation of what ought to be done which was so desirable. Without speaking from the knowable point of view, even the most ignorant must feel what great improvements might be made if the recommendations of Mr. Penrose were followed out—viz., that experienced architects should be employed for the exceedingly important task of criticising the works of their neighbours, instead of those who had little or no previous preparation being set to so difficult a matter. There were just one or two remarks he should like to make with reference to St. Paul's Cathedral. In the first place, in regard to the exterior, they had been told what an admirable thing it would be if they could only wash it. Now, of all the silly things he had heard for a long time past that was the silliest. He remembered some twenty years ago the same subject being started. People then said, "If you want to improve St. Paul's, wash the external part of it. Go and see this, that, and the other buildings that have been washed." The late Dean and he took the trouble to do as they were recommended, and their feeling was that such buildings looked exceedingly like dirty streaky bacon. Anything more hideous than the effect of the water upon the stone could not be imagined, and anybody who had thought

of colour or what an ancient building ought to be, would certainly reject at once the very idea of attempting anything of the sort. He was glad to find that his view was entirely in accord with those of the gentlemen present. Then with regard to the interior of St. Paul's, he had taken a very deep interest in it. When appointed to a canonry in St. Paul's nearly twenty-six years ago the first thing he thought of doing was to go to Italy for the purpose of getting some idea of what they ought to aim at. He had no knowledge of architecture, or of what should be done; but, anyhow, he then thought that if one had appreciative power they might gain by looking on some building in Italy belonging to the same school of architecture, and might sooner or later have the opportunity of furthering what was wanted. At the present time he thought they were making efforts which, he hoped, the world at large would consent to regard as being successful. He believed that, under the guidance of Mr. Richmond, they had been successful with the mosaic put up in St. Paul's, and if the public allowed them to go on with the work, as he believed there was every prospect they would, they hoped it would be brought to a satisfactory conclusion. Like most great works, however, it would be the work of years—a work of effort and of genius on the part of him who had the direction of it, and, at the same time, one of patient perseverance and of absolute assent to the proposal of the skilled man they employed. Something had been done, and a good deal had been spent, and he trusted that before very long more would be seen of it. It would take, at all events, a couple of years before they could see the scaffolding taken down to some extent out of the choir, and until then the work would appear at a great disadvantage. Then with regard to the latter remarks of Mr. Penrose, he felt it would be out of place for him to criticise them. Seeing St. Paul's, as he had done, twice a day for more than twenty years, one necessarily grew to love and admire it, and to think there was no other place to equal it. He trusted that, as long as he lived, his great desire would be to see it more and more beautified. He was rather glad that Wren's second plan had been preferred to the first, because as he looked at the earlier design it seemed to him not to be equal to that which was eventually brought to a successful conclusion. It was a scandal that a building designed to be decorated, as St. Paul's was, should have been allowed to remain without that decoration for 200 years. At the same time, it was possible that the skilled men of the present day were more able to decorate the building in the best manner than the men of an earlier period might have done. Although he was disposed to be somewhat of a *laudator temporis acti*, he nevertheless felt that the artists of the present day excelled in many important respects those who had preceded them. With regard to Vanbrugh, the one architect about whose works he did know something, whenever he saw any of his buildings he felt how true the couplet was:—

"Lie heavy on him, Earth, for he  
Laid many a heavy load on thee."

The weight of Vanbrugh's buildings, rather than their beauty, was the thing that struck one the most.

Mr. Alma Tadema, R.A., seconded the vote of thanks to Mr. Penrose, whom he had often called "our great Athenian." As an Hon. Associate of the Institute, he considered it a great honour to be *en rapport* with so distinguished a body. As a member of the Royal Academy, too, he was specially interested in the subject of art education. That education he found was never thought of in the great schools and universities. Civil engineers, and others employed by the country, were not asked whether they knew anything about architecture, and such matters, but, when the time came, if they were successful, they were put on committees and judged such things quite freely. It was a pity that a scheme could not be devised, to bring that idea to bear upon those who were directing the education of the country, and it was needless to say that he was in favour of the proposal to have a museum of drawings and photographs of buildings and monuments. That would cause in the public mind a desire for the study of that art which was the greatest ever produced by mankind—that art to which painters and sculptors belonged, and which in these modern times of division of labour had been perhaps a little bit chopped up into all sorts of details. He always felt a certain pang, when hearing such descriptions of architects as Mr. Penrose had given, to think they were deprived of knowing a little more of the men to whom they owed so many of the wonderful cathedrals scattered all over the

country. These men were lost in oblivion, but they were loved and admired none the less.

The vote of thanks, on being put to the meeting, was carried with acclamation.

The President, in thanking the meeting, added that it was of course impossible to make statements which would altogether run on all-fours with everybody's feelings. He then moved:—"That an expression of sympathy and condolence with the widow and children of the late Wyatt Papworth (Fellow), in the loss they have sustained by his death, be entered on the minutes of the meeting, and communicated to them." This proposition was unanimously agreed to.

The President also announced that the next meeting would take place on the 19th inst., when a paper would be read entitled "Notes on the Architecture of China," by Mr. F. M. Gratton (Fellow), of Shanghai.

The proceedings then terminated.

## INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS:

AUTUMN MEETING AT BUSHEY AND HAMPSHIRE STRAID.

A MEETING of the Incorporated Association of Municipal and County Engineers was held on Saturday last, for the purpose of inspecting the Colne Valley Water Company's works at Bushey, and also the Hampstead Electric Lighting station, which has been recently opened.

The members of the Association having assembled at the offices of the Colne Valley Waterworks Company,

Mr. Brough Taylor, M.Inst.C.E., read a short description of the works, from which it appears that they supply a district of seventy-five square miles, most of which lies in Hertfordshire, the smaller portion being in Middlesex. This area extends from the boundaries of two of the London water companies, up to the districts of Watford and St. Albans. The average supply is about one million gallons daily, the population at present supplied being about 45,000. The water is obtained from wells in the chalk formation, the stratum being found at the surface in the neighbourhood, and has a thickness of about 600 ft. The first well, which now forms the engine-well, was sunk in 1874, and it is stated to have yielded about 820,000 gals. in twenty-four hours when first pumped out, but the yield gradually decreased to 600,000 gals. In 1881 it was determined to increase the available quantity of water, and with this end in view a second well and deep boring were sunk and connected with the engine-well by an adit below the line of saturation, so that the overflow from the new well should run by gravitation to the old well. The second well is 43 ft. deep and 7 ft. diameter, and from this depth a bore-hole 18 in. in diameter was sunk to a depth of 477 ft., being then reduced to 15-in. diameter, and continued for a further depth of 180 ft. through the chalk marl, ultimately reaching the gault at 700 ft. from the surface. The quantity of water which this second well is stated to have contributed is 635,000 gals. per twenty-four hours, making with that obtained from the engine-well, about 1,235,000 gals. per day. When Messrs. Taylor, Sons, and Santo Crimp were first called to advise the directors of the company, they found that this figure represented not the average but rather the maximum yield from the wells, the minimum at that time being scarcely 1,000,000 gals. per day, and as the period of minimum yield in chalk wells occurs about the time of the maximum demand of the district, it was soon found necessary to increase the yield by new works. The objects his firm had in view were (1) to lower the engine-well, so as to enable them to get the suction of their pumps further down below the line of saturation; (2) to cut the deep boring at the lowest possible level, in order to liberate the water which would undoubtedly issue when the top pressure was removed; and (3) to form a new pump-well in which at any future time additional pumping-power could be placed. These works were carried out by Messrs. Thomas Docwra & Son, and the result has been to give the company three times as much water as they had before; the available minimum supply being now well over three million gallons per diem, and the operations were carried on without any interruption of either the softening process or the supply to the district. The pumping-engine was designed by his firm in 1889, and was manufactured by Messrs. R. Moreland & Sons, and set to work in 1891, since which time it has performed all the company's pumping. It is



one of the compound beam type, with upper and lower lift pumps and surface condenser. The Lambert trip-gear is introduced into the engine. The lower pump is furnished with a bucket at bottom and plunger at the pump-head, and the upper pump is of the combined bucket and plunger type. The lower lift raises the water from the pump-well and discharges it into the softening-tanks, and the higher lift draws from these tanks and delivers its water through the pumping-main to the reservoir. The pump horse-power of the engine when running 10 revolutions per minute is 13.5, and at this speed it discharges 1,400,000 gals. in twenty-four hours. The steam is obtained from one or other of two Lancashire boilers, 30 ft. long and 7 ft. diameter, steaming at about 80 lbs. pressure. In reference to the process of softening water before sending it for supply, his partner, Mr. Midgley Taylor, had contributed the following account of the process, and the works required for carrying it on:—"Rain-water falling upon the earth contains practically no dissolved solid matters, and is perfectly soft, but contains varying proportions of dissolved gases, including carbonic acid, which the rain has absorbed from the atmosphere. In percolating through the strata down to the underground natural reservoirs, the water dissolves and carries with it any soluble matter with which it may come in contact; and owing to the presence of the carbonic acid gas it is capable of dissolving carbonate of lime or chalk, which would otherwise be practically insoluble. These various dissolved matters cause the hardness of water. It is apparent, therefore, that the dissolved salts causing hardness may be divided into two classes: (first), those which are soluble in water by themselves, and (second) those which are held in solution by the aid of the dissolved carbonic acid. The salts in the first class cause what is called permanent hardness, and those in the second temporary hardness, or that which can be removed by the expulsion of the carbonic acid, as in boiling, or by its absorption, as in softening. The chief salts which have a hardening effect upon water are the carbonates of lime and magnesia, causing temporary hardness, and sulphates of lime and magnesia, causing permanent hardness. I shall only refer to the former salts causing temporary hardness, as that is all that can be removed by the softening process. The softening here is effected in the usual manner by adding lime-water to the hard water, and for those to whom the process is not familiar, the following observations will, I hope, make it so. Sixteen ounces of chalk consist of about 9 ozs. of lime and 7 ozs. of carbonic acid, and by burning the chalk the carbonic acid is driven off, leaving the 9 ozs. of lime, which may be dissolved in not less than 40 gals. of soft water. This solution is called lime-water. An average sample of chalk-water is presented by 16 ozs. of chalk held in solution by 7 ozs. of carbonic acid dissolved in 400 gals. of water. Now, when the solution of 40 gals. of lime-water containing the 9 ozs. of lime is mixed with the 400 gals. of chalk-water containing 16 ozs. of chalk and 7 ozs. of carbonic acid, the 9 ozs. of lime will combine with the 7 ozs. of carbonic acid, forming 16 ozs. of carbonate of lime or chalk, which being insoluble precipitates, and the carbonic acid being thus absorbed, the 16 ozs. of chalk, previously held in solution, is likewise precipitated: the resultant therefore is 2 lbs. of precipitated chalk in 440 gals. of softened water. The process thus consists of a very simple chemical reaction, and one that is easily adapted for dealing with large volumes of water. The plant at this works comprises a small tank with stirrer, where the slaked lime is reduced with water to about the consistency of cream, two lime-water tanks for dissolving the cream of lime to form lime-water, and a range of settling-tanks, where the reaction and deposit takes place. The cream of lime from the mixer is run into the bottom of one of the lime-water tanks, which is then filled with soft water, thoroughly agitated, and allowed to settle. The lime-water thus made is then decanted into one of the settling-tanks, when about ten times its volume of hard water is pumped in, and the mixture is then left until complete settlement has taken place, when the clear softened water is pumped away to supply. We find that with three settling-tanks the pumping, both of the hard water into the tanks, and the soft water therefrom, may be carried on continuously. Each tank-full of soft water is tested with nitrate of silver, to ascertain that the whole of the lime has been neutralised, and the degree to which the softening has been carried is estimated clearly. It may be stated roughly the relative cost of softening water by

lime, carbonate of soda, and soap respectively is:—

Lime.....	1/-
Soda.....	20/-
Soap.....	£20

Apart, however, from the commercial aspect of the case, and, speaking generally, it must be conceded by sanitarians that water treated in this way is distinctly improved in quality, and is, therefore, safer for dietetic purposes." The works are in the charge of the Engineer-in-charge, Mr. John Blackburn, A.M.Inst.C.E.

An inspection of the pumping-station and water-softening works was then made, after which the members partook of lunch, which was served in the engine-room.

The President, Mr. A. M. Fowler, C.E., occupied the chair.

Mr. Santo Crimp briefly proposed the toast of the Association of Municipal and County Engineers, and the President and Mr. Lewis Angell replied.

The President having thanked Messrs. Taylor, Sons, & Santo Crimp for their reception of and hospitality to the members of the Association that day, and Mr. M. Taylor having replied on behalf of the firm, the members proceeded to Hampstead to inspect the electric-lighting station and works there, and to hear a short paper upon the installation by Mr. W. H. Preece, C.B., F.R.S.

Mr. Preece said that the contract for the supply of the light was placed in the hands of Messrs. Siemens, the buildings being designed by Mr. Ardron, and the work carried out by local firms. A very scattered population had had to be dealt with, although the principal part of that population was centred in the neighbourhood of Old Hampstead, and it was only possible to meet the requirements of every part of the parish by the introduction of the high-pressure alternating system. At the present time there was not an inch of the parish that could not be supplied from the building in which they were assembled. Those buildings consist of an engine-room, which has two spans, and a boiler-room, and they afforded space for 50 per cent. more plant than they had already laid down, which would supply thirty thousand lamps fixed, and with the addition of another steam dynamo they would be able to supply another forty thousand lamps fixed. The boiler-house contained four Lancashire boilers, each competent to evaporate 5,000 lbs. of water per hour. The distribution throughout the district is on the high-pressure system. The mains are carried to seven substations to different parts of the parish, and from these stations the distribution to the houses is entirely by low-pressure. In Mr. Preece's opinion electric-lighting at Hampstead was going to be a very great success, for although they had been open no more than three weeks they already had a load of 7,869 lamps. They started with the idea of getting orders for 10,000 lamps in two years, and in his opinion they would have 20,000 a less than twelve months. They were charging 6d. per unit for the light, but they had a sliding scale, and the price might be reduced to 4d. per unit, while for power purposes it would be less still.

The President having thanked Mr. Preece for his paper, and Mr. Lewis Angell having said a few words, Mr. Preece replied, and the members dispersed.

#### THE SANITARY INSPECTORS' ASSOCIATION.

The first meeting for the Session of 1894-5 of this Association was held on the 3rd inst. at Carpenters' Hall, London-wall, when the Chairman, Mr. H. Thomas (Bermondsey) delivered his annual address. There was a good attendance of members, including, with most of the principal executive officers, Mr. S. C. Legg (Hackney), who is resigning, after many years of honorary service, the office of Secretary. Mr. Thomas, after glancing backwards twenty years at the progress of sanitation in the Metropolis, in which he found many reasons for congratulation, referred to the present condition of matters sanitary and to points upon which further progress was necessary and to be desired. The indifference formerly almost universal with regard to the purity of drinking water, to the position of drains, water-closets, and various sources of pollution, and of the construction and position of cisterns had largely disappeared. The banks of the Thames were no longer those mounds of excreta, emitting in hot weather the most offensive effluvia, that they had been within the memory of most of the

members. The Thames was no longer a stream of death and the source of infection, or of fatal epidemics to the dwellers on its shores. Open cesspools, privies, and middens had disappeared, and the sewers were not now the elongated cesspools which the absence of ventilating shafts, intercepting traps, and inspection chambers formerly made them. Wherever the metropolitan main drainage system applied, drainage might be considered fairly good, but in local sewers there was ample room for improvement. It was not creditable to some of our Local Authorities to find unventilated sewers, untrapped gullies, and open gratings the rule in certain districts where the fear of increasing the rates made the authorities turn a deaf ear to the warnings and appeals of their sanitary inspectors, and led to the neglect of their reports. Why should open sewer-gratings continue to emit their nauseous emanations when with the myriads of high chimney-shafts and furnaces of the Metropolis all the sewer-gas might be so easily cremated? Slum dwellings, back-to-back houses, and the narrow, ill-ventilated courts so common thirty years ago were rapidly disappearing; well-constructed blocks of dwellings were taking their place, and systems of the regular and frequent collection of house refuse were extending, the by-laws of the London County Council, made to this end, being a great step towards securing the total abolition in the metropolis of the dust-bin, and all its filthy surroundings. The power of enforcing the notification of cases of infectious diseases had proved a blessing to London, since its adoption in the Public Health Act of 1891, but it had become an abuse in some places, and unnecessary alarm was caused in the public mind by the tendency to look upon every sore throat as a case of diphtheria, and every scratch on the skin as erysipelas. The removal of infectious cases should be done at the instance of the proper sanitary officers, instead of on the application of the patient's friends or medical attendants. All the sanitary officers of Boards in London were, or ought to be, in telephonic communication with the offices of the Asylums Board, and removals could always be the most judiciously as well as expeditiously carried out if effected through the sanitary officers. The legislature having transferred the duty of preventing the pollution of the atmosphere by smoke nuisance to the sanitary inspectors, it was for them to justify the public confidence by intelligent watchfulness over factories and bakehouses. They must report such nuisances again and again to their local authorities until they were stirred into action against these sources of pollution. But here again it was necessary to point out the danger of a growing abuse. The indiscriminate condemnation of all underground bakehouses merely because they were underground, must seem absurd to all practical men, and the trading community would probably be the gainer if some of the work devolving upon the medical officer of health with regard to them were transferred to the sanitary inspector. The Chairman alluded, in conclusion, to a practice growing too common, of the readiness of medical and sanitary officers, for the sake of court fees, to appear in courts to give evidence against each other. They could not refuse to attend a court on subpoena, but they could always refuse to make the required visit where it was likely to fetter the hands of a brother sanitary officer.

In the discussion which followed, several of the points suggested in the paper were discussed, and the last point led to the proposal of a resolution by Mr. Grigg condemning the practice. The terms of the resolution were considered too drastic by most of the speakers, and it was eventually withdrawn. A protest was raised during the discussion, in the interest of assistant sanitary inspectors, against the conduct of some chief sanitary inspectors, who, it was alleged, were often harsh, unjust, and arbitrary in their treatment of subordinates. No resolution was proposed, but Mr. H. Alexander (Chief Inspector of Shoreditch) proffered to give an address on the subject at a future meeting. A cordial vote of thanks was accorded. In the members' conference which took place subsequently, Mr. Young (Battersea) referred to the additional difficulties put in the way of sanitary officials by a recent decision of a Marylebone magistrate, by which combined drains would be regarded as sewers. The effect would be to transfer to local bodies, who could only with great difficulty be got to move where expense had to be incurred, the onus of keeping in proper repair many drains for which, hitherto, property-owners had been held responsible. It was decided to leave the question to the Council for consideration and report.



### Illustrations.

#### COUNTY COUNCIL OFFICES, WAKEFIELD.

**T**HE contract for the erection of these buildings was entered into last June, and the works have been pushed on by Messrs. Armitage & Hodgson, under the guidance of Mr. A. E. Marsh, the clerk of works. The site is an excellent one, being bounded by four streets, situated near the highest part of the city, and adjoining the Court-house and the Town-hall, erected some years ago from Mr. T. E. Colcutt's designs.

A considerable amount of demolition had to be done to clear the site, and the excavations, being to a great extent in rock, have also retarded the work a little. A capital foundation is secured, and already considerable portions of the main walls are above ground. The whole of the façades to the streets are faced with tooled Ashlar stone from Mr. Turner's Brookholes quarry; this is a hard stone of fine even texture and colour, and weathers well in this district.

The floors and ceilings are being constructed by Messrs. S. Ferguson & Son, of Carlisle, on their fire-resisting system.

The perspective view now published was hung in the Academy, and was set up from the contract drawings. Some modifications in detail will, no doubt, be made in preparing the full-size details, which are of elaborate character.

The competition drawings, published in the *Builder* of April 29, 1893, afford a comparison of the variations already made, while giving a good idea of the type of building, the main lines of the design having always been adhered to.

The drawing was executed in water-colour by our assistant, Mr. T. Duncan Rhind.

GIBSON & RUSSELL.

#### WICKHAM HALL.

THIS house, the residence of Mr. G. Mellin, situated at West Wickham, near Beckenham, Kent, has for two years past been undergoing alteration and extension, rendering it of considerably more than double its former area, on plan, and proportionably increasing the accommodation.

The removal of the old kitchen block enabled the building to be extended westwards as far as conditions of the site would allow, the requisite accommodation being just secured by the projection forwards to the main road of a wing comprising servants' offices. From behind this another wing, containing billiard and smoking rooms, &c., extends backwards, bending at an angle with the main garden front. Between these two wings and the existing block of the old house, there is planned a large new dining-room, overlooking the lawn, and, on the entrance-front, a staircase-tower and a breakfast-room. From the old front entrance-hall, now enlarged, and made two floors high, a wide corridor is carried through the house terminating in a back hall, cut off by a glazed screen, and well lit by a glass slope.

Here is placed the tradesmen's inner-entrance, approached from its outer door by a covered colonnade open to the air. The dairy is entered from this, having an ice-house beneath it reached from the basement. Extensive and light cellars are obtained under the whole of the new building, accessible by a gentle incline direct from the tradesmen's outer door, which opens on to the side road to the stables.

A feature of the house is the new kitchen, lined to its ceiling with glazed bricks in colours, and lit entirely from the roof by a glazed lantern. The comfort of the servants has been considered in planning their adjoining sitting-room with a sunny aspect and two bay-windows. A short serving route is arranged from the kitchen to the dining and breakfast rooms, each of which has its serving-door, shut off from the body of the house by swing-doors in the corridor. A hot-plate dresser in the back hall and a hatch for the return of plates through to the scullery, will facilitate the serving. The butler's pantry is immediately adjoining, fitted round with glazed cupboard doors, and having, opening from it, a fireproof plate safe.

On the house-side of the glazed screen partitioning off the back hall rises the children's staircase in proximity to the garden entrance. This latter consists of a circular vestibule separating the dining-room from the billiard-room, and forming, on plan, the pivot, as it were, on which the whole billiard-room wing turns, making a bend in the long façade towards the garden as



above-mentioned. From this vestibule, the billiard-room is approached through large sliding-doors of old oak opening on to a railed balcony which affords a view over the room from a height of three steps above the general floor level. The walls of this room are being lined with old panelling and embossed leather from Belgium, whence comes also the marble altar-piece now adapted as an overmantel. Centreing opposite to this is a wide-spreading bay-window, fitted with side seats, giving views over the terrace and lawn. At the upper end of the billiard-room an archway, with flanking openings, affords access to the smoking-room, an apartment ceiled by a low dome on pendentives, with semi-domes on either side, all executed in concrete and finished in plaster. In this room a semi-circular apse, with small windows of stained glass, closes the vista obtained right through the billiard-room from the centre of the garden-entrance vestibule. On the other side of this vestibule lies the dining-room (measuring about 22 ft. by 40 ft., with a large bay-window in addition), all panelled in oak up to the springing of its ceiling-cove. The breakfast-room, across the corridor, has its joinery of mahogany, including a high dado and mantel. The corridor itself is being lined with old oak panelling, and in the front hall an elaborate oak doorway of the sixteenth century, from Hildesheim, is being worked into the new wall-panelling, as the library entrance. Overhanging balconies in oak afford views down into the hall from above.

Guests' rooms occupy the first-floor of the billiard-room wing, and over these again, in the roof, the whole area is thrown into one large children's play-room, with its floor constructed independently of the ceilings under it. The sloped ceiling of this room springs from a deep wooden cornice crowning the upright panelling of which the walls are formed to a height of about 5 ft.

Over the dining-room and garden entrance is placed the family suite, containing its private bath-room, three other bath-rooms being provided in the house. On the same floor, just across the corridor, is the boudoir, in a sunny aspect, and having little seated bay-windows and a pair of casements opening on to a balcony above the wide breakfast-room bay-window. Close by is the school-room, and over the boudoir, on the second floor, is the boys' room, fitted up with complete double sets of drawers, wardrobes, cupboards, &c. Other bedrooms also have specially-designed fittings.

The main tower staircase, the children's staircase, and the one in the servants' wing are constructed with stout oak treads bedded solid on concrete in which iron supports are encased. All floors in the new work are laid over coke-breeze concrete and iron construction.

In the external treatment of the building an endeavour has been made to blend the new work with the old, and as far as possible to render the whole architecturally one design. This is much helped by extending the cream-coloured coat of lias lime rough-cast, used on the new work, over all remaining wall-surfaces and re-running the cement-dressings. The old garden front elevation, with its two bay-windows symmetrically arranged, is now extended by an additional bay of the same design—the centre thereby being shifted—and gables affording extra accommodation in the roof are thrown up over the wall-spaces between the bays. By reconstructing the roof over the old house to line with the new portion another floor of servants' rooms is obtained.

From above the garden-entrance, a low circular tower containing a cistern-room is carried up, marking the point where the change of direction

in the garden front is taken by the billiard-room wing.

A domed conservatory is designed for the end of the old house, having a fountain placed centrally with the glazed doors opening from the drawing-room.

A conspicuous feature on the entrance front is the main tower, thrown forward at the junction of the new building with the old, covering the transition from one to the other. The cupola on this, sheathed with copper, will form an observatory containing an 8-in. refractor telescope, which, with the observatory, is being constructed by Sir Howard Grubb, of Dublin.

The installation for electric-lighting of the house is being carried out under the advice and superintendence of Messrs. Massey & Allpress, the wiring being executed by Messrs. Strode.

All soil drainage and plumbing has been entrusted to Messrs. Dent & Hellyer, who have also supplied and fixed the water-closet apparatus, baths, lavatories, and sinks.

A supply of soft water is secured by storing the rain-water in a large underground tank, with a filtering-chamber; thence it will be pumped up by electricity to a cistern, for distribution to the various draw-offs. Messrs. F. Edwards & Son are responsible for the hot-water supply from the kitchen boiler, and the hot-water heating by an independent boiler, as well as for the cooking-ranges and the grates, with their tiles throughout. Many of these latter are arranged as ventilating grates, discharging fresh warmed air into the rooms—extract flues also being provided.

The smoke-flues of the best rooms on the ground-floor are continued downwards to admit of their being swept from the basement.

Locks and door furniture are supplied by Mr. Jas. Gibbons. The stained glass is by Mr. C. E. Tute, and the plain lead-glazing by Mr. J. Jennings. Messrs. Waygood have put up the lifts, and Mr. F. Izant the electric bells and alarms. Marble work has been done by Mr. Lovelock. Messrs. Thurston are building the billiard-table to a special design.

With the exception of a staircase from Mr. Heymann, of Hamburg, all the oak-work and plaster-ceilings in the hall are being carried out by Mr. J. E. Knox, who is also executing other carved work. Messrs. Geo. Candler & Sons, of Brixton, are the general contractors, the architect being Mr. Walter Millard.

#### RESTORATION OF THE CHANCEL, CANEWON CHURCH, ESSEX.

THE present work consists in the restoration of the chancel only. Before beginning the work, every piece of stone that appeared to be sound was provisionally marked with a red cross; the result has been that most of the original tracery has been preserved, and all the most interesting pieces of masonry throughout.

The east end has been entirely rebuilt, as it was in a dangerous condition, and temporarily supported on the north side of the east window by a great brick buttress. A new arch has been built across the entrance to the chancel; this arch is 15 ft. 6 in. wide and 21 ft. high. The piscina and sedilia have been uncovered, restored, and brought forward to the new plaster face. The old door to the vestry has also been uncovered and brought forward. The upper part of the north and south walls have been rebuilt in cement, to receive the new roof.

The old roof has been entirely removed, as it was in a very rotten condition. The new roof is open to the ridge; the principals, purlins, cornice, &c., are in pitch-pine, unvarnished; the common rafters are in fir, stained light oak, sized



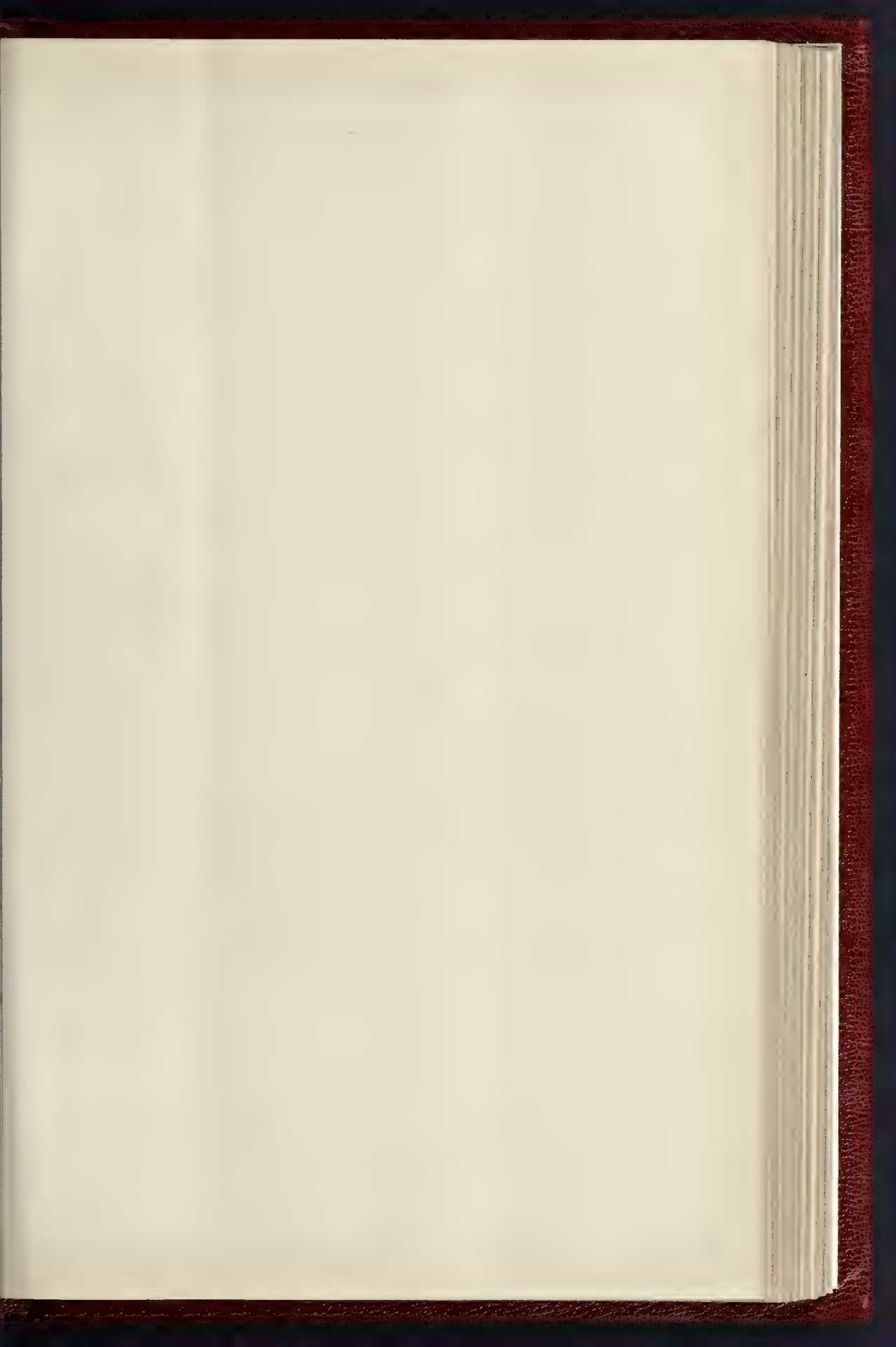




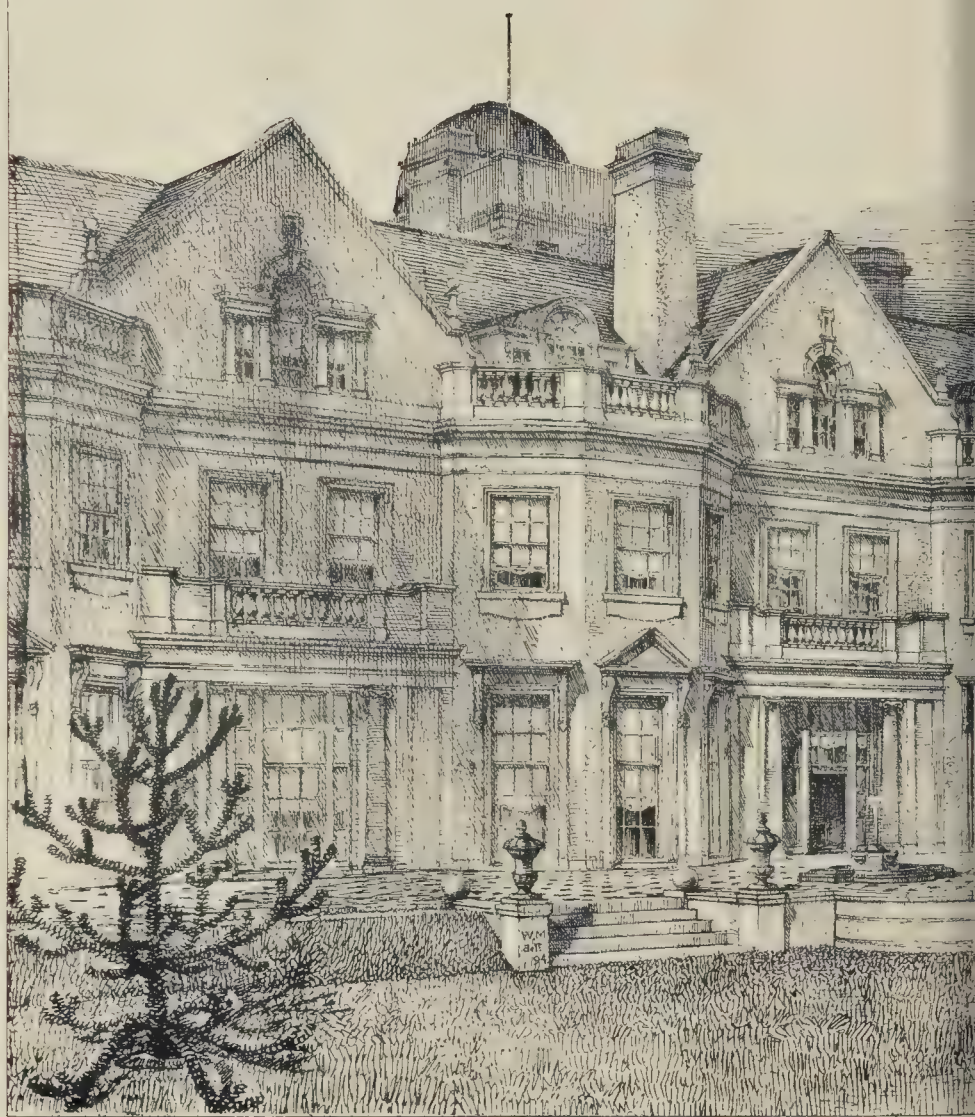
RESTORATION OF THE CHANCEL. CANEWDON CHURCH, ESSEX.—MR. W. HARGREAVES RAFFLES, ARCHTCT.

Royal Academy Exhibition 1894





2 Additions to  
 Wickham Hall, Kent.  
 Garden Front  
*Walter Murray, Archt.*





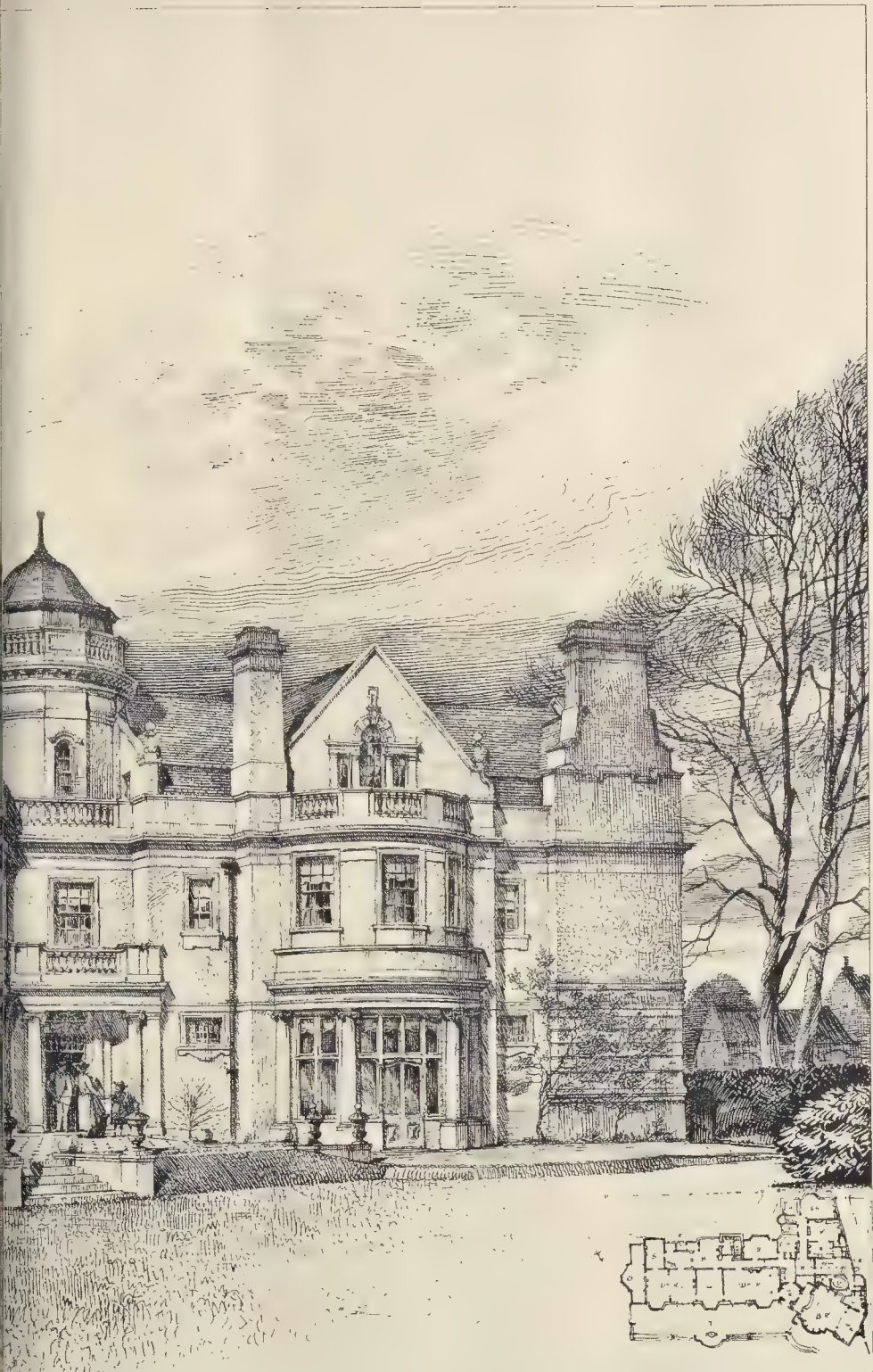
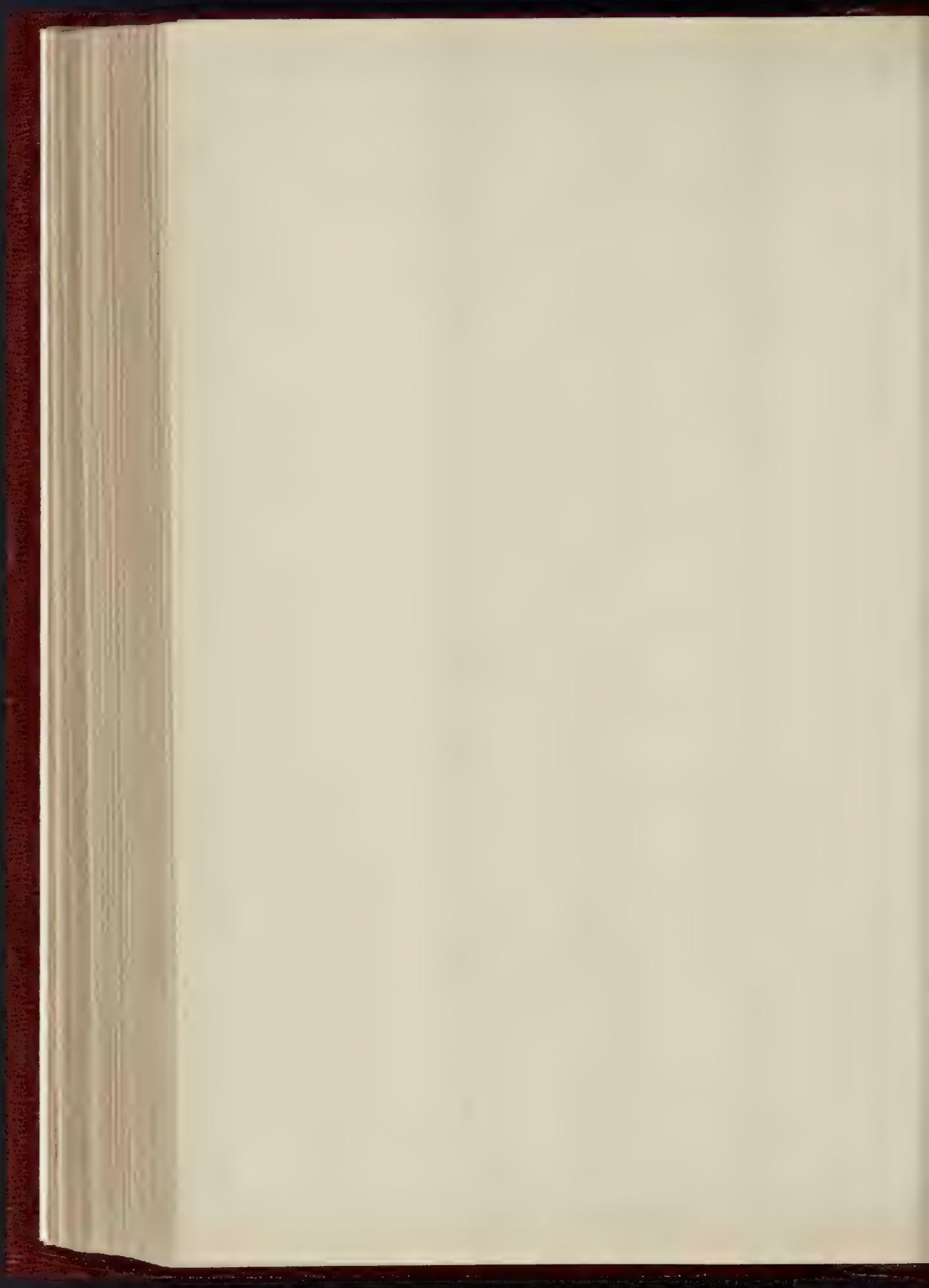
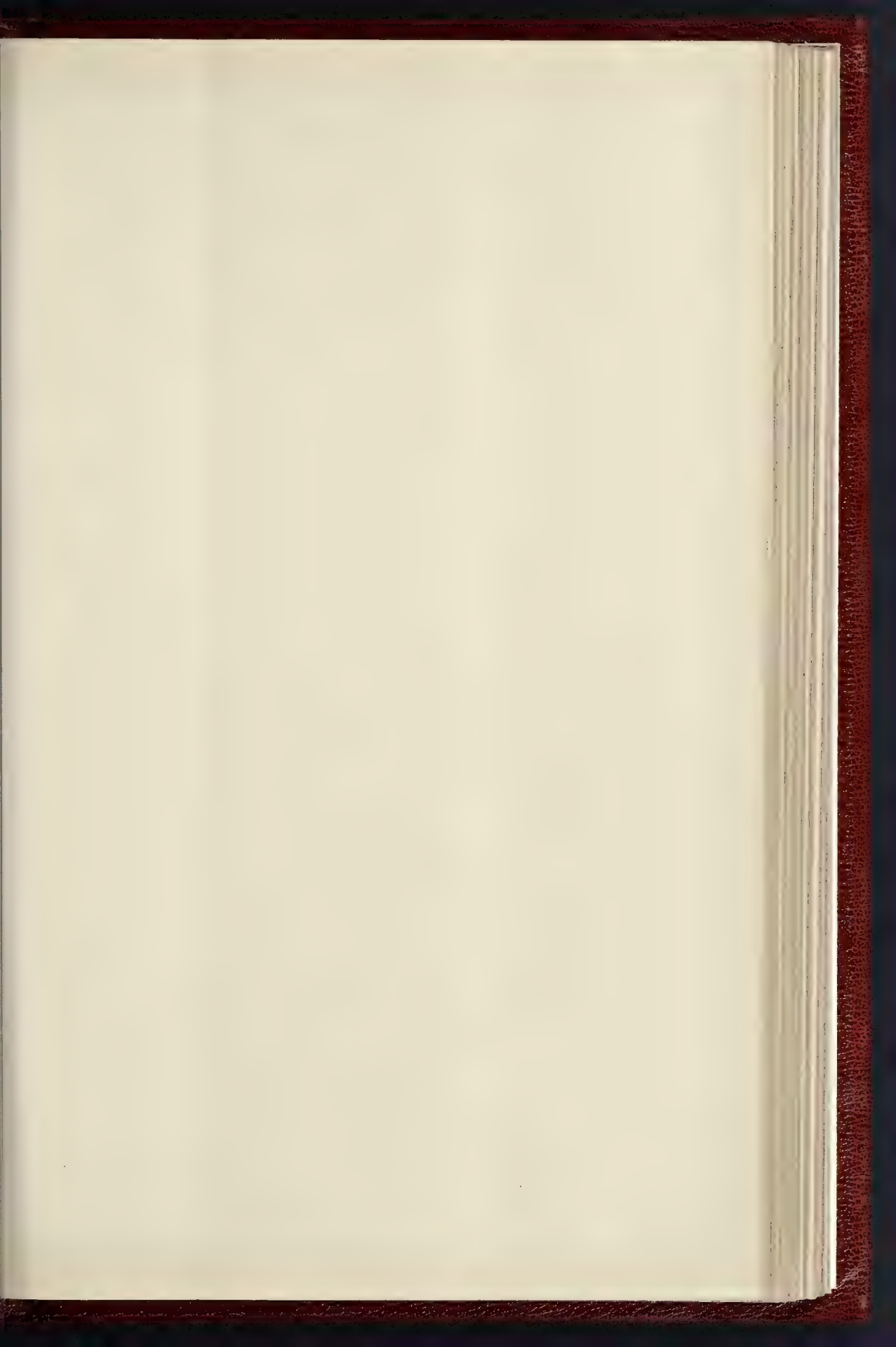


PHOTO-LITHO SPRAGUE & CO. 4 & 5 EAST HARDING STREET FETTER LANE F.C.







Additions to  
**Wickham Hall.**

Entrance Front. Kent.

Walter Millard. 1894.

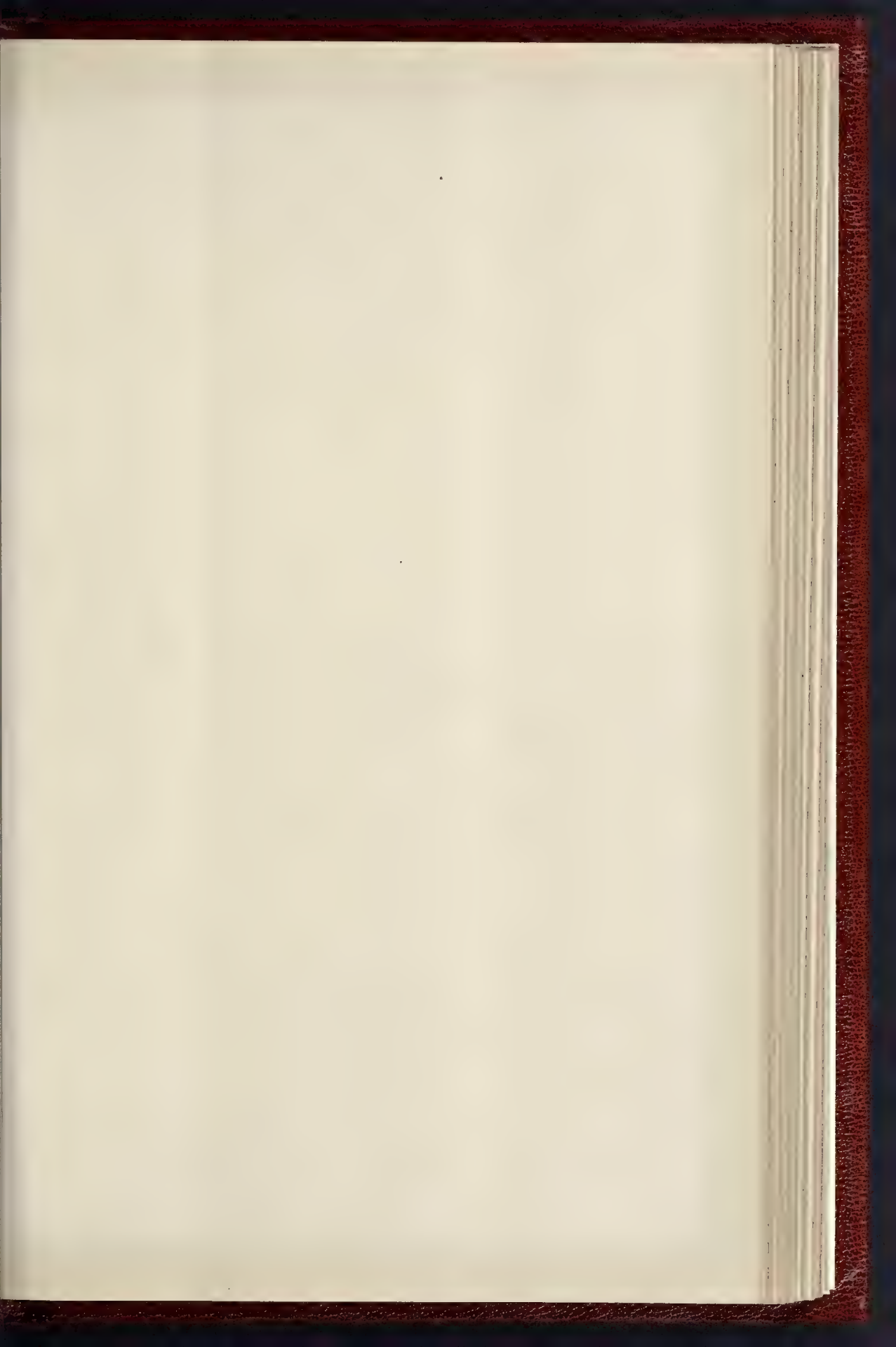












THE BUILDING, NOVEMBER 10 1894







Royal Academy Exhibition, 1894

NO. 10000. SERIES OF 10. 1894. LONDON. GILBERT, PRINTER. ANT. 1.





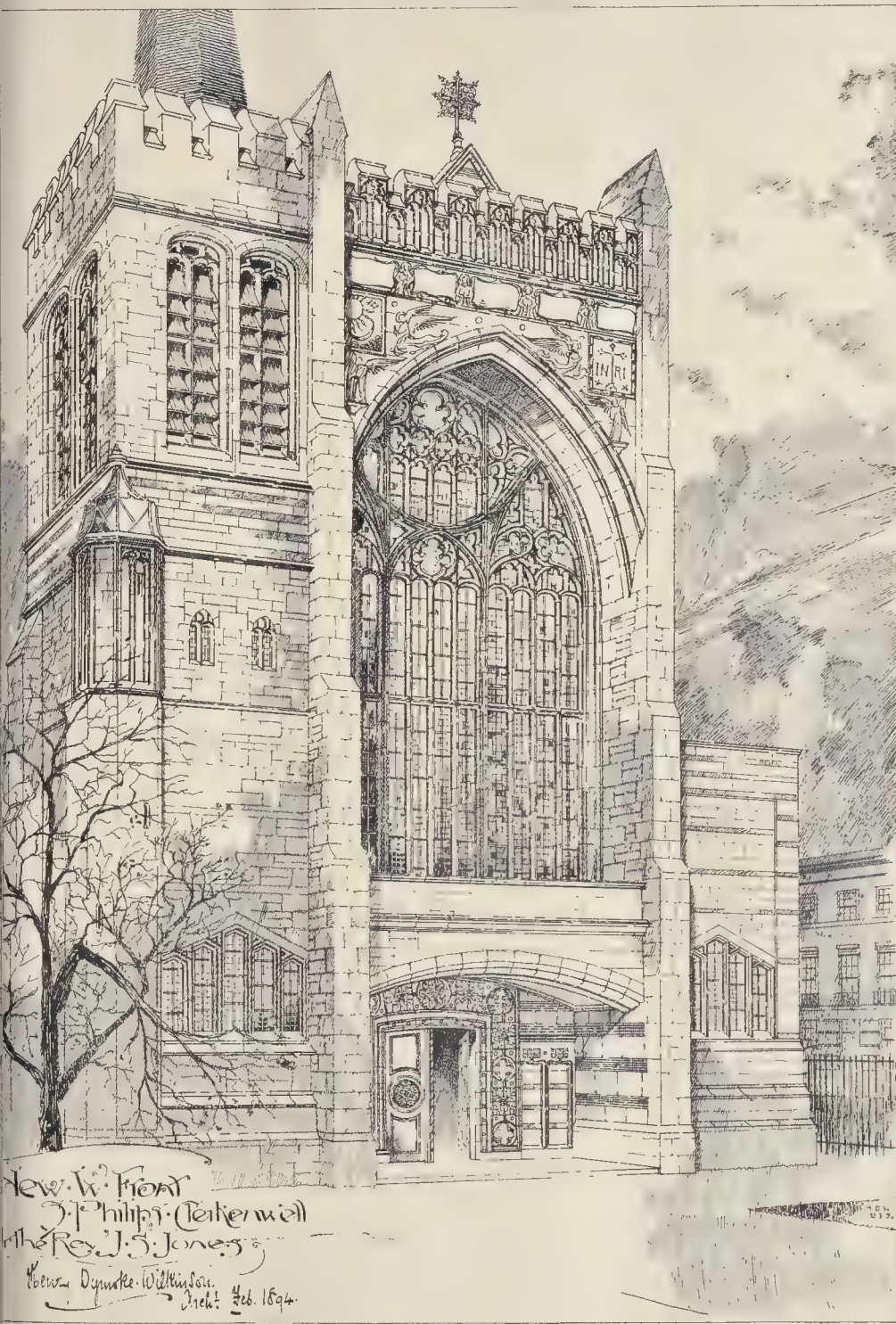


PHOTO L. THO SPRATUE & CO. P. A., EAST HARDING STREET, LONDON E.C.







intended to be executed in a red stone (such as Mansfield, or some stone of similar quality and colour), with bands and dressing of green-tinted stone; the porch to be in red brick and a grey stone, with a richly-coloured majolica doorway. The spandrels above the window to be in white majolica, in the style of della Robbia ware; the whole intended to form an effective combination in constructive polychromy. The drawing was exhibited at the Royal Academy this year.

#### MAGAZINES AND REVIEWS.\*

THE *Art Journal* commences with an article by M. Jean Bernac on M. Tony Robert-Fleury and his works, with some interesting illustrations, including a facsimile from a pen-sketch by the artist. Mr. F. G. Kitton writes an article on Rickmansworth, with some very pretty sketches by himself, and a whole-page illustration of a street scene in the small Buckinghamshire town, with the church in the background. An article on "Ancient and Modern Dancing" is illustrated by some representations of dances from Greek vases.

The Christmas number of the *Art Journal* is devoted to the works of Sir E. Burne-Jones, and contains a number of beautiful illustrations from his paintings. The literary portion is supplied by Mrs. Ady, and has the merit of enthusiasm for the writer's subject, though its critical tone may be called rather too optimistic; in other words, she sees all the painter's merits and nothing of his restrictions.

The *Studio* commences with the review of the work of Mr. William Stott, "of Oldham" (as he chooses to designate himself), by Mr. R. A. M. Stevenson. Some of the reproductions from sketches go to show that Mr. Stott can draw the nude figure when he chooses, in spite of the apparent evidence to the contrary of many of his paintings. The account is prefaced by a full-page reproduction of the "Awakening of the Spirit of the Rose," which was in the last Academy, and which certainly gives more promise than any previous work by the artist that we have seen. An article on "The Secessionists of Germany" gives some information in regard to a group of artists of whom not much is known in England. An article on "The Artistic Decoration of Cloth Book-covers," by Mr. Gleeson White, is accompanied by some original and exceedingly piquant designs by various artists.

The *Architectural Record* includes an article on the "Influence of the Early Renaissance on Painting," by Mr. Banister F. Fletcher, which shows a great deal of thought and observation on the subject, and is largely illustrated. "The Influence of the French School on Architecture in the United States" is the subject of an article by Mr. Ernest Flagg. Some remarks on the imitators of the late Mr. Richardson, who have out-heroded Herod in copying his mannerisms, we quite concur in, and it is hoped they will receive the attention of the culprits referred to.

The *Antiquary* includes an article entitled "More about St. Paul's Cathedral," which, however, deals with incidents connected with the cathedral rather than with the building itself. The same issue contains No. XV. of Mr. Haverfield's "Quarterly Notes on Roman Britain," and the first of a series of articles on English glass-making in the sixteenth and seventeenth centuries, by Mr. E. W. Hulme.

The *Fortnightly* (which appears for the first time with no editor's name on its cover) contains a short article by Mrs. Meynell on "Symmetry and Incident," which we commend to all who are interested in "the higher criticism" in art, as an article quite above the general run of art-criticism articles in magazines. It is a short consideration of the relative value of symmetrical and picturesque design, as represented by Greek and Japanese art respectively. Mrs. Meynell says, indeed, what we have maintained ever since the Japanese craze began; that Japanese art in comparison with Greek art is "local, provincial, remote, incapable of equal companionship with a world that has Greek art in its own history—that has Pericles to its father." There is not a touch of bigotry in Mrs. Meynell's article; she is fully alive to the merit of Japanese work; she sees "how delicate Incident may look when Symmetry has grown vulgar," but she also sees that Symmetry is the higher. We have always known that this perception must return again, but Mrs. Meynell's is the first utterance of it that we have noticed. The

\* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

same number (an unusually excellent one) contains articles on "Venetian Missals," by Mr. Herbert P. Horne; a most interesting piece of logical reasoning by Sir Robert Ball on the question of "The Possibility of Life in Other Worlds"; and an article by Mr. Rucker on Helmholtz, in the course of which the writer touches on the often-made comparison between music and architecture, but in a more scientific spirit than usual.

"The selection of a series of notes which were *a posteriori* found to obey certain natural laws, was voluntary. The scale itself is not natural, in the sense that it is not a necessary consequence of the construction of the ear. On the contrary, it is the product of artistic invention. Music is thus not a mere branch of mechanics, but an art. The architect and the composer alike deal with materials which are subject to mechanical laws, but they are alike free to fashion from these forms determined not by calculation, but by the sense of beauty."

In the *Contemporary Review* Mr. Frederic Harrison, in an article on "The Amalgamation of London," blows the trumpet of progress in his most vigorous style, in jubilation over the proposed extinction of the historic "City," which he regards as a solution of the municipal problem that cannot long be delayed. There are two sides to that question.

In the *Revue Générale* (Brussels) will be found the very eloquent article on the church of St. Stephen at Vienna, by Herr William Ritter.

The *Century* contains an article by Mrs. Van Rensselaer on "The Churches of Provence," with a whole collection of charming sketches by Mr. Joseph Pennell. It is, of course, rather of interest to the general reader than to the architect. The series on "Old Dutch Masters" is represented this month only by an engraving of the portrait of Paul Potter by Van der Helst. The new life of Napoleon, which starts in this number is accompanied by a number of illustrations of scenes, houses and rooms connected with Napoleon's early days.

In *Harper* the only article of artistic interest is one entitled, "An Artist's Impressions of Rajpootana," by Mr. E. L. Weeks, with illustrations by the artist, which include some architectural sketches.

In *Scribner* Mr. H. G. Prout continues his excellent article on "English Railroad Methods," an article which is highly complimentary to the management and personnel of English railroads, and shows a degree of insight and correct observation very unusual among foreign critics on this subject. It contains some good illustrations of viaducts, English roadside stations, &c.

In the *English Illustrated* an article on "Popular Art," by Mr. Mason Jackson, is chiefly concerned with the work of Sir John Gilbert, whose works (a good many of which are illustrated) are perhaps among the very best examples of that type of art which, while appealing mainly to popular tastes, preserves always a certain amount of dignity and power.

In *Lougan's Magazine* Sir Benjamin Richardson tells us, in a paper originally read at the Grindelwald Conference, "How to Make the Most of Life," in regard to preserving the best healthiness of body and mind; a subject of interest to men of all professions. The parallel, however, between the engine which did not wear out and the men who did, and the reasons for the difference, is rather far-fetched, and can hardly be accepted as serious argument.

In the *Gentleman's Magazine* Mr. Lacon Watson, in a short article on "The Specialist," concludes with a contrast between specialism in science and art. That a number of scientists should have contributed to the present condition of the electric light, he observes, does not distress us; "but it does appeal to our artistic taste, that a painting or sculpture, or even a piece of architecture, should be executed under the informing spirit of one man. . . . Salisbury Cathedral owes much of its charm to being almost entirely the work of a single architect." This is better good sense on the subject than we often read in a magazine.

In the *Pall Mall Magazine* Mr. Walter Besant continues his articles on Westminster, illustrated by Mr. W. Patten, who seems to have chosen (perhaps wisely) to illustrate bits and corners of the Abbey which are not popularly known, rather than its more familiar aspects. Mr. Clinch's article on "Christ's Hospital" is accompanied by some very interesting reproductions of old engravings showing portions of the school as it existed in former days.

In the *New Review* Mr. Dolman gives the second of his articles on "Municipalities at Work," dealing in this article with Manchester. He speaks quite rightly in praise of the energy of

the Manchester Corporation, as shown in the operations both at Thirlmere and in the case of the Canal, and in regard to the latter he is in doubt right in saying that unless the Corporation had taken it up and made themselves partially responsible the Canal would probably not have been carried out at all; but whether in so doing they have benefited Manchester is a question which must be left to the future.

*Blackwood* contains an article on "Club Homes for Unmarried Working-men," which may be of interest to our artisan readers.

We have received the fourteenth number of *Pictures from Punch*, including a great many very excellent specimens of Keene's drawings and some of Leech's historically interesting satires on "Bloomerism."

#### THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

*Australian Woods for Paving*.—The Finance Committee reported as follows, the recommendation being agreed to—

"On October 16 the Council referred it to the Finance Committee to consider whether the terms years for which loans are now granted to Vestries and District Boards for hard-wood paving may properly be extended, on account of the great durability of that wood as compared with the soft wood hitherto in use. It is only a few years ago that the woods now known in the London market as jarrah and karri were introduced from Australia as very desirable woods, from their hard texture, for paving purposes in place of the pine and deal hitherto in use, which are of a softer nature. There is no doubt that the jarrah and karri woods are much the hardest, and presumably will therefore last the longest, but we are not aware that either of these woods has been tested in England for paving purposes for so long a period as ten years, although it is thought from inspection of jarrah wood which has been laid down for some time that it will probably last ten years. We are therefore of opinion that no sufficient test has yet been made of the period for which these woods will last, and that it is undesirable at present to fix any definite number of years over which the repayment of loans for paving with such woods should be spread, but that it should be left to the Committee as heretofore to consider each application upon its own merits, it being understood that the Committee will give the Vestries and District Boards the full benefit of any extension of term which the circumstances admit of. We recommend—

"That for the present no definite period be fixed for the repayment of loans for jarrah or karri wood-paving."

*The New Building Act and the Building Act Committee*.—The report of the General Purposes Committee contained the following paragraph, the recommendation being agreed to without discussion—

"The consolidation and amendment of the Bill relating to streets and buildings in London by the Act passed in the last session of Parliament rendered necessary an alteration in the form of the order of reference to the Building Act Committee. That Committee is satisfied to us a new form of order of reference, after careful consideration, which in our opinion is in all respects suitable for the purpose. The alteration is, as will be seen, one of form and not substance, the consolidation of the law into one Act of Parliament enabling the order of reference to be made somewhat more concise. We recommend—

"That the order of reference to the Building Act Committee be as follows:—The Committee shall consist of not less than ten and not more than twelve members. The London Building Act and all matters arising out of it shall stand referred to the Committee. In the following matters the Committee shall exercise the powers of the Council:—Construction of buildings; Special and temporary buildings and wooden structures; Rights of building adjoining owners; Dangerous and neglected structures; Signs; Storing of wood and timber; Prevention of obstructions in streets (Section 194); District Sanitary except in regard to private appointments; Dismissal of rats and other vermin; or taxes of payment of rates; or matters arising under the Act, the Committee shall report to the Council. The Committee shall enforce by-laws made by the Council with respect to the various matters referred or delegated to the Committee, and shall submit to the Council for approval such other by-laws with respect thereto as may seem expedient. The Committee shall have power to take necessary legal proceedings under the Act, but shall not prosecute or apply to the High Court without the sanction of the Council. The Committee shall exercise the powers of its Council under the Factory and Workshop Act, 1891. The Committee may direct the seal of the Council to be affixed to such licences, consents, sanctions, approvals, or notices may be granted or given by the Committee, in behalf of the Council. The Committee may meet as often as may be necessary, when the Council is in recess, and it is made so held, as well as at any meeting held so nearly before recess that it is impracticable to take up a report before the Council adjourns for the recess; the Committee shall have power to grant or refuse any application made to it under the Building Act, and generally to act in behalf of the Council in relation to the matters included in the Committee's order of reference; provided that



shall act only upon such decisions as are previously arrived at by the members present. All such decisions shall be reported to the Council at its first meeting after the recess."

**Compulsory Purchase of Tramways.**—In accordance with special notice required by the Act, Mr. Edwin Jones (Chairman of the Highways Committee) moved:—"(a) That a notice in pursuance of the seal of the Council, be served on the London Tramways Company, requiring the company to sell to the London County Council, under the conditions and in the manner provided by Section 43 of the Tramways Act, 1873, the whole of the tramways, works, and buildings authorised by the Metropolitan Street Tramways (Extension, &c.) Order, 1873, and the Metropolitan Street Tramways (Extension, &c.) Order, 1873, as confirmed by the Metropolitan Tramways Orders Confirmation Act, 1873. (b) That the clerk be instructed to lay the foregoing resolution, and to serve notice therein referred to so soon as the Council of Trade shall have signified its approval. That it be referred to the Finance Committee to consider the necessary steps to obtain the insertion in the Council's Money Bill of the year 1895 of a clause empowering the Council to raise the money required for the purpose of purchasing the said tramways, works, and undertaking." He said it was a proposal to purchase two miles of tramway from Kennington Park-road to Great Portland-street in the Old Kent-road. Although it was only a small portion of the line, it was an important section, inasmuch as two important branches branched from it. The other portions of the line, about seventeen miles, would fall in about four years. He did not anticipate any opposition on the part of any member of the Council.

Mr. Benn, M.P., seconded the motion. The division the voting was—For the motion, against, 4.

**Tower Bridge (Southern Approach) Bill.**—The report of the Parliamentary and Local Government Committees reported that they had agreed on the resolution of the Council of the 9th, referring it to them to consider and report to the Council what further steps it was desirable that the Council should take in connection with the Tower Bridge (Southern Approach) Bill, the inquiry to include also the question of route. There could be no doubt as to the desirableness of forming the approach, and the Council considered the alternative routes which had been suggested, as well as the line of approach which had been submitted to Parliament, and strongly of opinion that the latter line should be adhered to. The question of the form of the Bill should be again presented to the Council and also engaged their attention, and careful consideration they had come to the conclusion that the best course would be to amend the Bill in the form in which it left the Council. Commons. They recommended—(1) That the Council of route previously decided by the Council for the southern approach to the Tower Bridge be adhered to. (2) That the Bill be reintroduced in the next Session in the form in which it was passed by the House of Commons and sent up to the House of Lords in 1894.

The recommendations of the Committee were adopted after discussion on two amendments. The Council adjourned after transacting other business.

## ENGINEERING SOCIETIES.

**INSTITUTION OF JUNIOR ENGINEERS.**—The "The Junior Engineering Society." The President, Alexander Siemens, M.Inst.C.E., of which, has accepted the presidency of this Institution for session 1894-5, in succession to Mr. Wolfe Barry, C.B., V.P.Inst.C.E.; and the President's Presidential Address on Friday, 16th inst., at the Westminster Palace.

**INSTITUTION OF CIVIL ENGINEERS.**—The Institution of Civil Engineers is building new premises, but these will not be ready until a year or more. In the meantime arrangements have been made by which the old meeting-room can be used from a temporary entrance in Great George-street. The members will assemble next Tuesday, 14th inst., to hear the inaugural address of the President, Sir Robert Rawlinson, K.C.B., and to witness the ceremony of presenting the prizes and medals awarded for papers read last session. **TRADE.**—The briskness in this trade still continues. Prices are being discussed and will be fixed for the coming year. A moderate advance is anticipated, but one that will not discourage trade or invite competition.

## ARCHITECTURAL SOCIETIES.

**BIRMINGHAM ARCHITECTURAL ASSOCIATION.**—We have received the Report of the Birmingham Architectural Association, from which we learn that a class of design has been started in connexion with the Association, under the direction of Mr. Bidlake; and also that some new and satisfactory arrangements have been made in regard to the permanent use of a room, for centralising the work of the Association. The Report is accompanied by some sketches by Mr. Bewlay of some of the places visited during an excursion to Broadway.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—The usual monthly meeting of this Association was held on Tuesday evening, in the Rooms, 114, West Campbell-street—the President, Mr. A. N. Paterson, in the chair—when Mr. J. Kennedy Hunter (Messrs. Morris & Hunter, Ayr) delivered a lecture entitled "On Trump," being the description of tours in Northamptonshire, from Kettering as a centre, undertaken in September of this year. Photographs from Mr. Hunter's camera of many interesting parish churches, and some domestic work, were exhibited by means of limelight, the lecturer adding a running commentary. Among others, views were shown of the Eleanor Cross at Weekly; St. Sepulchre's, at Northampton, one of the few circular churches in England; the famous Saxon tower of Earls Barton, and several different views of Peterborough Cathedral. In concluding, Mr. Hunter recommended Northamptonshire as a field for sketching well worth a visit, and remarked that in every hamlet work is found which will repay close and intelligent study. He advised those going sketching to have a definite scheme of work mapped out before leaving.

## Correspondence.

To the Editor of THE BUILDER.

### THE COUNTY COUNCIL AND THE NEW RIVER COMPANY.

SIR,—In your issue of October 27 is a report of the Parks Committee of the County Council respecting a notice from the New River Company requiring alterations to be made in the flushing apparatus at Waterlow Park. Apparently the County Council is unaware of its rights. The water supply in question is not a supply for domestic purposes, and as a consequence the County Council has a right to be supplied by meter, and when so supplied the New River Company will have no right whatever to interfere with the fittings. The charge for water will probably be very much less than by rate; we usually find it about one-fourth.

Apparently it is not generally known in London that the companies are compelled to supply water by meter for other than domestic purposes at a rate provided by their Acts of Parliament. In the Act of one of the companies, however, the price is omitted, and this company charges what it pleases, but we think a refusal to pay if followed by an application by the company to a Court of Law would result in the Court giving judgment for a merely reasonable rate. At any rate, the New River Company is not in this position, and it is perfectly clear the County Council can demand a supply of water by meter, and there is a simple and inexpensive method of enforcing its demand.

T. A. EADON,  
Secretary, Water Carriage Engineering Co.

### BATH ABBEY CHURCH.

SIR,—In the paper on this building in the *Builder* of November 3, the writer has adopted the, to me, untenable theory that the present church is but the nave of the earlier one of Bishop de Villula, and that the original transepts, choir, &c., lay further to the east, and have been completely destroyed.

Some years ago I made a careful study of the existing building, and by the comparison of it with others of the Benedictine Order I arrived at the following conclusions, which I incorporated in a paper on "Church Doorways," read before the Bath Field Club, December 12, 1888.

I. On the south side of the church there are three doorways (one in the second bay from the west, and the others in the two bays east of the transept). II. The first-mentioned, from its position, must have faced the west walk of the cloister, and abutted on the abbot's house, and so would be the "abbot's door."

III. The present vestry door is the corresponding one facing the east walk (the "monks' door").

IV. I have seen a plan (dated 1725) that gives the square of the cloister, about 110 ft. each way, and shows the following peculiarities—viz., the north walk was not close to the wall of the church, but beyond the present transept, and was connected with the abbot's and monks' doorways by short passages, the present vestry being one, and the

east walk about 3 ft. lower than the others, following he then fall of the ground eastwards.

V. The Norman arches in the east walls of the aisles are not in the middle, showing thereby that the turrets on either side are contemporary.

VI. These turrets, from the analogy of other Norman Benedictine churches (e.g., Gloucester, Durham, Peterborough), must have flanked the chord of the apse, the high altar standing exactly where the apse for one does at present.

VII. The door just east of the present vestry must have opened into the sacristy, a perfectly convenient site with relation to the high altar in this position, but highly incongruous if this was only the nave of the church.

VIII. The present transepts, I believe, replace two flanking towers—the building being of similar ground-plan to Exeter Cathedral—and mark the boundary between nave and choir. They are very similar to the choir transepts at York, which replaced flanking towers of an earlier structure.

IX. The central tower, like the transepts, is of such late work (James I.) that all idea of a monastic church had long passed away. As the apse and Lady Chapel had been destroyed, it was built to complete a mutilated design as far as possible.

X. There is a rise of about 18 in. in the plinth east of the sacristy doorway. This could not be owing to the rise of the ground—for we know it fell towards the east—but must be from the internal rise to the high altar. Prior Birde's chantry occupies the post of honour beside the high altar, as might be expected, he being practically the refounder of the church.

There are many other points—trifling in themselves and almost impossible to describe on paper—that confirm my theory, and I have never met with any that upset it.

REGINALD A. CAYLEY,  
Bath, November 5, 1894.

SIR,—In your interesting though short account of Bath Abbey Church in this week's number of your paper, you state that the flying buttresses to the nave were added under Sir Gilbert Scott's restoration of the church. This is not the case, as these buttresses were erected about the years from 1823 to 1834—when the Corporation of Bath, as then patrons of the living, carried out a great restoration of the church and its surroundings, at a large cost; removing also many houses built close against the edifice, which had been a disfigurement for centuries, and thus improving the approaches to, and the appearance of, the church. In 1832 the patronage was transferred from the Corporation to the Simeon's Trustees, by whom it is now held.

J. DAVIES.

### ACTION OF WATER ON GALVANISED IRON.

SIR,—Has "G. H." any iron connexions attached to his galvanised tank? If so, this would probably account for the apparent destructive action of the water; or, perhaps, the tanks were not properly coated with zinc in the first place, and consequently some unprotected "spots" of iron were left exposed to the action of the water and zinc. When zinc and iron are placed in contact in water containing mineral salts (especially chlorides of sodium and magnesium) a galvanic action is produced, and this is, perhaps, the cause of "G. H.'s" trouble. Some months ago I placed an iron plate in a galvanised iron pail containing sea-water, and in the course of a few days the zinc had disappeared from that part of the pail which was in contact with the water. If the destructive action is, however, due merely to some constituent of the water, it would, as you say, be impossible to answer "G. H.'s" questions without making a chemical examination of the water.

H. H.

### "WARNER & CO. v. GAY AND OTHERS."

SIR,—Permit me to correct an error in your report of the case of myself and another *versus* The Dulwich Constitutional Club, which appears in last week's *Builder*. The judgment was entered for the plaintiffs, with costs on the *High Court* scale, and not as you put it.

WALTER DAVIES  
(BOULNOIS & WARNER).

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XIX.

FIRE SERVICE, VALVES, AND METERS.

THE details necessary for the provision of an efficient fire service too often receive but scanty attention in waterworks construction, especially in rural districts. The advantages of having a powerful stream of water, easily put into requisition and capable of playing upon any portion of a building in a state of conflagration, are too great to need impressing upon the student. It is necessary, however, to point



out that these facilities can frequently be attained at very little extra cost if the necessary arrangements are included in the original design of the waterworks, whilst the cost of their subsequent provision may be prohibitive. The principal points to be kept in view in making provision for fire-service are:—

1. That there shall be a surplus storage of water for fire extinction over and above that required for general purposes, and always available.

2. Such storage to be at a sufficient elevation to allow of the water being forced above the tops of the highest buildings in the district.

3. The mains and distributing-pipes to be of such dimensions as to allow of the water for fire extinction purposes being conveyed through them when the demand for water for other purposes is at its greatest.

These requirements cannot always be secured in their entirety, but they indicate the lines which must be kept in view. The surplus storage is usually included in the capacity of the service-reservoir, and the amount to be allowed for must depend upon the special requirements of the district under consideration, as well as upon the means at the disposal of the engineer.

Assume, for the sake of example, that on the grounds of probability and expediency, only one fire at the same time in the district is to be provided for, that the probable time occupied in extinguishing the fire will be three hours, and that one jet, 50 ft. high, will be required. Theoretically the height of the water issuing vertically from a jet should be equal to the head upon the jet, but the resistance of the air causes a considerable reduction. Experiments show that the difference between the theoretical height and the actual height attained by a jet of water varies approximately, directly as the square of the theoretical height and inversely as the diameter of the jet.

Mr. Box ("Practical Hydraulics") gives the following formula—

$$h' = \frac{H^2}{d} \times '0125,$$

Where  $H$  = the head on the jet in feet,  
 $h'$  = the difference between the height of the head and the height of the jet,  
 $d$  = diameter of the jet in  $\frac{1}{8}$  of an inch.

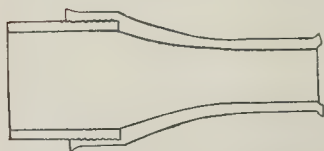
It is evident from the above relations that in order to obtain the best results from an available head, a jet of special diameter corresponding to that particular head must be used. Assuming an available head of 70 ft. at the point under consideration, then

$$h' = 70 - 50.$$

$$d = \frac{H^2 \times '0125}{20} = 3$$

or the proper diameter of jet to be used, under the circumstances, is  $\frac{3}{8}$  of an inch. The quantity of water discharged by a jet with a given head depends upon the form of the jet (see Chap. x., Gauging by means of an Orifice), the best form being that which approaches most nearly to the "vena contracta" (fig. 51). The discharge

Fig. 51.



through this form of jet may be taken as '943 of the theoretical discharge due to the head. Applying this coefficient to the formula

$$Q = 8'025 \text{ ca } \sqrt{h'}$$

$$Q = 8'025 \times '943 \times [(70)^2 \div 144 \times '7854] \times \sqrt{70}.$$

$$= '04856 \text{ cubic feet per sec.}$$

$$= 18'21 \text{ gals. per min.}$$

If the jet is required to play for three hours, then the quantity of water discharged will be  $18'21 \times 60 \times 3 = 3277'8$  gallons. It would, therefore, be necessary to provide surplus storage capacity in the service reservoir for, say, 4,000 gallons; and the diameter of the mains and distributing pipes must be chosen so as to allow of an extra quantity, equal to 18'21 gallons per minute, being conveyed through them when the demand for water for other purposes is at its greatest.

In order to render a fire-service efficient, it is

necessary that a sufficient number of hydrants should be provided upon the system, the situations being selected with great care, so that each may yield the maximum of efficiency. They should be easily accessible, capable of rapid manipulation, not difficult to find in the dark, and so constructed as not to be affected by frost.

In designing a waterworks system, the available head at any point is arrived at by deducting the loss of head due to friction in the pipes from the static head at that point (Chap. xi.). It must be remembered that these results will only hold good provided that the system is water-tight, allowing practically no waste. Sir Frederick Bramwell, speaking of the evils of waste, at a recent meeting of the Institution of Civil Engineers, expounded this point very clearly:—"Another point was the diminution of the pressure in the pipes. It was impossible to obtain an extra amount of water through a given-sized main, except by having a greater differential pressure between the entering end and the delivery end of the main. The entering end of the main was fixed by a reservoir or a stand-pipe level, or whatever it might be, and the consequence was that the increase in the differential pressure must be obtained by diminishing the pressure at the delivery end. What was the result? Any hope of using the water for hydrant purposes, for extinguishing fires, was gone; there was no pressure for that."

The two principal types of hydrants or fire-cocks are the sluice-valve and the ball-hydrant. There are innumerable forms in the market, but they are all modifications or combinations of these two types. The sluice-valve hydrant consists, as its name implies, of a sluice-valve connected with the main, with a bend attached to its outlet fitted at its upper end to receive a stand-pipe to which the hose is fixed. The stand-pipe is either fitted to the hydrant by a screw, or bayonet-joint. The stand-pipe is sometimes a fixed pillar, which has the advantage of easier access at times of fire. The sluice-valve is the best form of hydrant, but entails a heavier first expense than the ball-hydrant. A frost-cock, which may be automatic, must be attached on the outlet side of the sluice-valves, for the purpose of removing the water which would otherwise remain in the bend (or pillar) after use.

The ball-hydrant, patented by Messrs. Bateman & Moore, consists of a vulcanite ball contained in a valve-box; the outlet to the box, which is vertically above the ball, and is fitted with a leather or india-rubber washer, being kept constantly closed while the water in the main is under pressure, by the ball, which is lighter than the water, being forced up against it. The stand-pipe is attached to the hydrant by means of a bayonet-joint; and the valve is opened by depressing the ball by means of a spindle passing down through the stand-pipe and worked by a crutch-handle. Ball-hydrants are economical, and work exceedingly well with moderate heads. With low heads they are apt to leak, and with high heads the ball is liable to be forced out of shape, causing leakage when it takes a new bearing upon its seat. Another objection is caused by the suction into the main through the ball-hydrant, when the former is being emptied of any liquid matter, frequently of a filthy nature, which may be at the time in the hydrant-chamber. Ball-hydrants also act as air-valves, but with very doubtful advantage, on account of the large orifices, which allow the air to escape so rapidly, while the main is being charged, as to endanger the pipes by shocks.

Air-valves are used for the purpose of getting rid of the air which constantly accumulates at the highest points of undulations in the line of pipe, especially where such points are situated above the hydraulic mean gradient (see Chap. xi.). They are either automatic, in which case they are identical with the ball-hydrant except that the aperture which serves for the escape of the air is much smaller ( $\frac{1}{8}$  to  $\frac{1}{4}$  in. in diameter); or they consist of small stop-cocks, opened and closed by hand.

Sluice-valves vary little in form, and usually consist of a cast-iron body containing a movable diaphragm which slides vertically between grooves. The sliding faces both of the body and of the movable valve should be made of gun-metal, as well as the screw which actuates the valve and the stuffing-box gland through which the screw works. It is best to obtain them with spigot and socket ends attached by means of bolts and nuts, so that they can be removed if necessary without cutting the pipes. Sluice-valves should be fixed at all branches in a waterworks system; and the mains and branches should be divided up into easily-

worked sections by means of sluice-valves, so each section may be isolated from the rest with a minimum of inconvenience to the consumers generally. Sluice-valves should be plentiful in all waterworks systems, and it is false economy to attempt to make a saving by reducing their number.

Water-meters are inserted in a line of pipe for the purpose of measuring and registering the flow of water passing through them. There are three types—the positive and the inferential, the positive meter measures the flow of water causing it to alternately fill and empty a vessel known capacity, the number of times that process takes place being recorded by means of clock-work mechanism. The positive meter is subdivided into high and low-pressure meters, the Duncan, Kennedy, Frost, Schönherr, Frager, and Kent meters representing the former, the Parkinson and Tylor representing the latter. The inferential meter consists of a chamber through which the water flows, containing a wheel with vanes or discs attached. The vanes in passing impinge against the vanes and of the wheel to revolve, the revolutions being recorded as in the positive meter. The Siemens Tylor and Sporton meters are instances of this type. The mechanism of the positive meter is similar to that of the cylinder and slide-valve high-pressure steam-engine, while that of an inferential meter may be compared to a water wheel or turbine. Messrs. Turner & Bright ("The Principles of Waterworks Engineering") give the following essentials as characteristic of a perfect water-meter:—

1. Accurate registration of the quantity of water passing through it, whether great or small.
2. Ability to perform its work without causing a material loss of head in the supply-pipe.
3. Cheapness and simplicity.
4. Ease of attachment and repairs.
5. Freedom from excessive wear of the wearing parts.

Section 58 of the Public Health Act, empowers a Local Authority "to agree with any person to supply water by measure, and as payment to be made in the form of rent or otherwise for every meter provided by them." The question as to whether the supply of water for domestic use should be charged for by meter has been largely discussed. There is a feeling against this method on sanitary grounds as far as it applies to houses of low rental, objection raised against it being that water would be economised at the expense of cleanliness and health, in the very situations where the water is of the greatest importance to the general community. Where the water is supplied for trade or manufacturing purposes the case is different, where it can be arranged, the sale should be by meter. This question is of the most important where the water has to be pumped.

Meters have not been largely introduced in rural districts, although they can be applied with great benefit to farm—especially dairy—supplies. In a dairy-farm where the milk is refrigerated, the consumption of water for the purpose alone is frequently 1,000 gals. a day.

As the size of the pipe for conveying a quantity of water to any premises frequently depends on other considerations than its capacity for delivery, it must not be taken as the gauge by which the meter to be inserted on its line. The following table, which refers to Siemens' Inferential Meter, will be found useful in deciding the size of meter applicable in any particular case:—

No.	Inch.	Delivery in Gals. per H.	
		50 ft. Head.	150 ft.
1	$\frac{1}{8}$	150	
2	$\frac{1}{4}$	300	
3	$\frac{3}{8}$	600	1,500
4	$\frac{1}{2}$	1,500	2,000
5	$\frac{3}{4}$	2,200	3,000
6	1	3,000	5,000
7	1 $\frac{1}{4}$	4,000	7,000
7 $\frac{1}{2}$	1 $\frac{1}{2}$	6,000	10,000
8	2	8,300	14,000
9	2 $\frac{1}{2}$	13,400	23,000
10	3	18,500	32,000
11	4	27,000	46,000
12	5	45,000	77,000
13	6	70,000	120,000
14	8	90,000	154,000

It is always better to allow a safe margin in deciding upon the size of a meter. When



expensive, either on account of pumping or it is purchased by measure by the under- in the first instance, it will be found a wise plan to insert meters on all large connections to check upon waste and undue consumption, the consumer is not to be charged by the meter.

# OBITUARY.

**P. G. HAMERTON.**—Mr. Philip Gilbert Hamerton, the editor of the *Art Journal*, died on Sunday at the Parc des Princes, Boulogne-sur-Seine, at the age of sixty. Among his principal works are "A Painter's Camp in the Highlands," "Etchings and Etchers," "The Graphic," which he also in early life published a work on "The Art of the Artist." Residing for some time in Scotland, making his home in France, he produced a large volume of verse, "The Isle of Loch and other Poems," with illustrations by himself, and subsequently contributed to the *Illustrated London News*, the *Fortnightly Magazine*, the *Saturday Review*, of which latter journal he was for two years—1866-8—the art critic. Mr. Hamerton was an honorary member of the Burlington Club, and of the Society of Painter-Etchers, and of the French Academy, and of other learned societies.

**D. A. LANGE.**—Sir D. A. Lange, civil engineer, of Hyde Park, and Hurstpierpoint, died on the 2nd inst. The deceased was born in 1828, by Sir David Pasha, Viceroy of Egypt, and was in Canada, and was for some years Director in England of that work, on completion of which he received the honour of knighthood from the Queen. He was a Fellow of the Royal Geographical Society, of the Society of Antiquaries, and of a large number of learned Associations, both at home and abroad.

# GENERAL BUILDING NEWS.

**REGENTAL CHURCH, MIDDLESBROUGH.**—The first of a series of services to celebrate the centenary of St. George's Congregational Church, Middlesbrough, was held on the 23rd ult. The service was in the central thoroughfare of the town, over an area of 1,280 square yards. The style was treatment of Early Gothic. The church is a large hall with a large doorway placed at the end of the tower dividing the church from the buildings. The tower is 16 ft. square, and rises upwards of 100 ft. The church itself is a double-gabled transept, and choir. The aisles are low and the windows small. The lighting is obtained by clerestory windows and large openings in the gables. The roof is barrel-shaped, finished inside with unadorned pitch-pine. The choir is divided from the nave by a screen, and is divided from the transept by a moulded arch. The floor of the choir is the whole of the nave, stepped for the stalls, which are placed on one side of the choir-arch, and the other on the other side of the choir-arch, and the other on the other side of the choir-arch. The communion railings, communion table, and pulpit are of oak and pitch-pine, and are of a simple design. The ground floor provides accommodation for 860 adults, and a small gallery decked across the eastern end of the nave, provides seats for other seventy. The whole of the walls are filled with tinted cathedral glass in lead. A roomy organ-chamber is provided on the north side of the choir, which has arched openings both into the choir and north transept of the church. Special exits have been provided. The buildings for the Sunday-school and social are placed alongside the church, and front into the street and Pelham-street, having entrances from both. Including the basement, these buildings are three stories in height. There are six bedrooms and recreation-rooms (three intended for use of women and girls, and three for the use of men and boys) on the ground floor. The upper part consists of a schoolroom, 56 ft. long and 30 ft. wide, exclusive of a platform recess and further room, and provision is made for 600 persons. The buildings are heated with hot-water pipes. Mr. Mitchell Bottomley, of Middlesbrough, is the architect, and the contractors are Mr. John Johnson, of Middlesbrough, and Mr. R. T. Snaith, of Darlington.

**NEW VICARAGE HOUSE, ALL SAINTS', KENTON PARK.**—The building, which is not yet completed, is of large size but of plain design, and of stock brickwork with bands, patterns, and courses of red brick. A few window-heads and courses of Bath-stone, and some stepped roofs, lend a little relief to the design. The principal rooms are on the ground floor, where there is a drawing-room with a bay-window, dining-room, and a large hall, and a large room for formal meetings, and the usual offices. Above the two floors of bedrooms. The roofs are covered with tiles. The house stands on the north side of All Saints' Church, and has been erected by means

of voluntary offerings from the congregation, aided by grants from the Ecclesiastical Commission, and other Church societies, for the Vicar, the Rev. Canon Trench. The builders are Messrs. Allen & Sons, of Kilburn, and the architect Mr. E. P. Loftus Brown, F.S.A. The whole has cost about 3,000l.

**LYCH-GATE, ENGLEFIELD, BERKS.**—A new Lych-gate and Churchyard Cross were dedicated at Englefield on the 4th inst. The former being the gift of the squire, Mr. Richard Benyon, of Englefield Park, and the latter of both squire and people, "in memory of much sickness, many deaths, merciful recoveries, in village and school." The Cross is of Hopton-wood stone throughout, and the Lych-gate of home-grown oak, roofed with oak shingles and resting on flint walling. Both works are carried out by Messrs. Wheeler Brothers, of Reading, the smith's work was by Mr. E. Downing, of Stony Stratford, and the whole has been carried out from the designs and under the supervision of Mr. E. Swinfin Harris, of London and Stony Stratford.

**INFECTIOUS DISEASES HOSPITAL, LEITH.**—The memorial stone of the new infectious diseases hospital in course of erection for the Leith Corporation at East Filton, Ferry-road, were unveiled on the 29th ult. by Provost Bennet. According to the *Scottman*, it was resolved to have the hospital erected on the cottage principle, and accordingly the architect, the late Mr. James Simpson, produced plans from which, with certain modifications, the building is being carried out under the superintendence of Mr. George Simpson, who succeeded his father as Burgh Architect. The buildings, which are of brick, include four ward blocks, isolation ward, administrative block, discharging block, laundry and disinfecting block, mortuary, reception-rooms, and gate-lodge. Each of the four ward-blocks is to be divided into two, and in each division there will be ten beds, with two additional beds for private or delicious patients. In the isolation ward there will be ten beds, so that altogether there will be ninety-eight beds. The sanitary arrangements of the buildings have received careful attention. It is expected that when fully equipped the hospital will cost about 35,000l. The contractors are Messrs. Mr. James Kinneir, joiners, Messrs. Drysdale & Gilmore, plumbers, Mr. P. Knox, slaters, Messrs. McLean & Reid, plasterers, Mr. J. S. Sutherland.

**RESTORATION OF HEVINGHAM CHURCH, NORFOLK.**—Hevingham Parish Church was re-opened, after the restoration of the roof of the nave, on the 24th ult. The new hammer-beam roof replaces one that had been erected in 1600, and, owing to decay, was called early in the last century. The work has been carried out by Mr. Chapman, of Hanworth, under the instructions of Mr. H. J. Green, Diocesan Architect.

**CHANCEL, HEAVITREE CHURCH, EXETER.**—A new chancel has just been opened at Heavitree Church, Devon. The new work consists of a chancel (taking the place of the small one pulled down) and two transepts (one used as an organ-chamber, and the other as a morning chapel). There are crypt vestries the whole size of the addition. The new tower is of early fifteenth-century work. The interior arches are of stone-work, and the roofs are of solid oak. That of the chancel is wagon-roof, with moulded ribs, and on the south side of the chancel is a sedilia. The sanctuary steps are of solid polished Devonshire marble. The dressed stonework is from the Box ground quarries, Bath, and the stone for the walling is from Churston and Berry Head quarries. The architect is Mr. E. H. Harbottle, of Exeter; the general contractor is Mr. Laphorn, of Plymouth; Mr. Dart, Crediton, undertook the oakwork; while the carving has been carried out by Mr. Rogers, of Exeter. The total cost of the work has been between 4,000l. and 5,000l. In the chancel is a carved oak altar-table, with super-altar, designed by the architect. The front is divided into three panels; the central one contains a foliated cross, and in the flanking panels are "Alpha" and "Omega" respectively, intermixed with carving. The super-altar is of the same material, and the whole has been carried out by Messrs. Harry Hems & Sons, Exeter.

**ROYAL FREE HOSPITAL, GRAY'S INN-ROAD.**—The new buildings, erected after, as we are informed, Mr. William Harvey's designs, are nearly completed. They comprise a dispensary, board-room, and secretary's offices, isolation wards, casualty-room, laundry, and residential quarters for the medical and nursing staffs. These occupy the site of the old front, with laundry, in Gray's Inn-road, which had formerly been a barrack and stables of the City Light Horse Volunteers. The improvements extend also to a reconstruction of the drainage, and fresh fire-extinguishing apparatus; and are estimated to cost 28,000l., towards which 22,000l. has been subscribed. The north or "Sussex" wing was rebuilt in 1855; the south and east blocks in 1877-9. The hospital was founded, 1823, in Greville-street, Hatton Garden, by Dr. Marsden, and removed to Gray's Inn-road fifteen years afterwards.

**ALL SAINTS' CHURCH, PETERBOROUGH.**—On the 1st inst. another stage towards the completion of the new church of All Saints, Peterborough, was reached by the dedication of the new portion of the building which has been added. The church as it

at present exists, yet wanting the tower to add a finish to the scheme, has cost about 5,000l. The present church is capable of seating 500 persons. The work has been carried out by Mr. John Thompson from the plans of Mr. Temple Moore, of Hampstead, London. The style is that of the fourteenth-century Decorated period. The exterior is of Bath stone, with Clapham and Bath stone dressings, and the interior work is Bath stone and brick, flat pointed and distempred for decoration. The nave is 21 ft. wide, and taking the south aisle, which runs parallel with the nave for the whole length, the width of the church is 40 ft., whilst the length from east to west is 104 ft. The church has flamboyant east and west windows, and it is further lighted on the north and south. The roof of the nave and chancel is pointed, the exterior being covered with tiles, and the interior panelled and ribbed with deal, painted respectively blue and cream. The iron tie-rods which run across the nave are painted red. The roof to the aisle is covered with lead on the exterior, and on the interior it is panelled with deal, which is coloured to correspond with the nave. The floors are wooden blocks, deal in the nave and aisle, but oak in the chancel. Round the interior there is a dado with cement panels and wood framing. The approaches to the church are by a porch on the south side, over which there is a figure of "The Blessed Shepherd," which has been carved and presented by Mr. Allan, sculptor. A porch is provided at the west end. A niche has been left, where it is proposed to place a figure of Our Lord with angels on either side. In the interior a traceried decorated oak screen has been erected. The carving of the screen has been wrought in the workshops of Mr. J. Thompson.

**CHURCH, MAYBURY, SURREY.**—The foundation-stone of the new Church of St. Paul, Maybury, was laid recently by Lord Middleton. The new church, which, when completed, will provide seating accommodation for about 600 persons, will be built in the thirteenth-century style of red brick with grey stone pillars. At present only the nave and chancel, providing accommodation for about 300 persons, are to be built. The total cost of the first portion of the work will be about 3,000l. The work is being carried out by Messrs. Harris & Son, builders, of Woking, from plans prepared by Mr. Ewan Christian, of London.

**BRISTOL CATHEDRAL RESTORATION.**—The Dean of Bristol has circulated a statement of the progress made towards the restoration of the cathedral. From this it appears that the central tower is completed. The ceilings of the choir and transepts have been thoroughly cleaned and re-distempred. Ventilation is being provided by new casements in the windows throughout the choir. The north-east and south-east tower-piers, with a view to make them more secure, have been filled in with nearly two tons of cement. All the concrete for raising the floor of the choir by seven steps, from its entrance to the Holy Table, is complete. The walls and piers in the choir are being cleaned from the roof downwards. The marble pavement for the choir will probably be all laid down by the end of the year, and the newly-adapted stalls fixed in their place at the western end by Christmas. In addition to all this, a stained-glass memorial window has been presented to the Lady Chapel, and the remaining window is promised. Canon and Mrs. Tetley are restoring two of the four bays of the ruined south cloister at their own expense, and Mrs. Gale Coles undertakes to restore the third. There remains one more bay to be restored. Mr. Pearson has made a careful survey of the exterior fabric of the building, from the north transept round to the Newton chapel, and on to the transept on the south side, and it appears that all the easternmost part urgently needs repair. This will cost 4,458l.

**HAREWOOD HOUSE, HANOVER-SQUARE.**—The Royal Agricultural Society has entered this week into possession of Harewood House, Hanover-square, their new premises. Harewood House, 13, Hanover-square, formed a portion of a much larger block purchased by the Duke of Westminster and Sir Walter Gilbey, who gave the Council of the society the option of acquiring the portion they wanted, for which—the necessary alterations included—the society have paid 30,000l. The mansion was the residence of Lord Harewood, and was built by Richard Adam, one of the famous brothers from whom the Adelphi took its name. All the rooms are of handsome proportions, and are decorated in their well-known style. The whole of the extensive additions, alterations, and restoration has been carried out by Messrs. Holland & Hannen from the plans and under the direction of the architect, Mr. Arthur Vernon.

# FOREIGN AND COLONIAL.

**FRANCE.**—There has been a meeting between the Minister of Public Works and a deputation from the Municipal body of Paris in regard to the Metropolitan Railway. The delegates asked for the abolition of a certain number of lines, returning to the system adopted by the Municipal Council in 1891. If the Government admits this proposal, it will nevertheless reserve the right to order the execution of the work in sections, as it may consider that urgency demands.—The works of the prize-men at Rome, in architecture, painting, and



sculpture, have been, as usual, exhibited at the Ecole des Beaux-Arts.—M. Henri Chardon, "Auditeur" of the Conseil d'Etat, has been appointed general secretary for the 1900 Exhibition.—The Municipality of Paris propose to acquire the Hôtel Saint-Fargueau, near the Caravelle, in order to enlarge the Municipal Library.—The Director of the Department of Fine Arts has commissioned from M. Barbeville a bust of the celebrated tragic actress, Mlle. Raucourt, for the decoration of the foyer of the Théâtre Français.—M. Albert Maigman is at present engaged in directing the execution, from his own cartoons, of the stained-glass windows intended for the decoration of the church of St. Philippe at Roule. The subjects of the windows are Sainte Clothilde, St. Louis, Saint Vincent de Paul, St. Denis, and St. François de Sales.—M. Geo. Roussel has been commissioned to execute the paintings in the Salle de Mariages of the Mairie, at Charenton.—M. Maurice Yvon has been appointed architect to the Colonial Office.—M. Louis Hista has been appointed Professor of Decorative Composition at the school in connexion with the Sèvres manufactory.—The works are shortly to be commenced for the prolongation of the north pier at Fécamp. The expense is estimated at 202,000 francs.—In a field called the "Closerie" at Saint-Pierre-la-Vieille (Calvados) the ruins of an important Gallo-Roman city have been discovered. A memoir on the subject has been presented to the Académie.—The death is announced, at the age of fifty-four, of the painter Charles Frère, who was a very regular exhibitor of rather sadly-coloured landscapes with groups of peasantry and horses, rustic fêtes, &c. Charles Frère was born at Paris. He belonged to the Société des Artistes Français, and had received medals at the Salons of 1882, 1883, and 1889.—The well-known archaeologist Léon de Palustris has died at Tours, at the age of 56. He had been Chevalier of the Legion of Honour and President of the Société Archéologique Touraine. His death has interrupted an important work on the History of the Renaissance in France. Among his works may be mentioned "Le Trésor de la Cathédrale de Trèves," and "Mélanges d'Art et d'Archéologie."—We learn also the death, at the age of sixty, of Georges Alexandre Roger, member of the Société Centrale des Architectes. He was a pupil of his father and of M. Questel, and took part successively in the work carried out at the Tribunal de Commerce and that at the Eglise Saint-Augustin. At the time of his decease he was a divisional architect of the Department of the Seine. He took part in the building of the Collège Rollin, for which his father was architect, and built a good many private houses in Paris and in the suburbs.

#### MISCELLANEOUS.

**THE COMMISSION OF SEWERS.**—A long discussion took place at the meeting on Tuesday of the Commissioners of Sewers of the City of London on the recommendation of the Special Committee which has been sitting for a considerable time upon the question of the reorganisation of the Engineers' Department, consequent upon the death of the late Chief Engineer, Colonel Haywood. The late Chief of the Staff was appointed some time ago to the vacant post of Chief Engineer, but the appointments to the subordinate positions have been delayed. Out of ten *engineers* only the three or four leading ones were recommended with an increased salary, the remainder with various periods of service from three to forty years being recommended for re-appointment at their former salaries. Exception was taken to the report of the Committee principally on the ground of unfairness or partiality in promoting Mr. J. G. Garthwaite, with 8½ years' service, with a salary of 350*l.* a year in place of 250*l.*, over the head of Mr. H. E. Stacey, with 21 years' service, who had been in receipt of 250*l.* a year, and to whom it was proposed to give 300*l.* a year, 50*l.* less than the Chief Assistant. Mr. Wallace proposed as an amendment that the report be once more referred back to the Special Committee, and the amendment was eventually carried. Some of the Committee's opponents demanded that the whole of the *engineers* should be dismissed, and that candidates should be invited by open advertisement to apply for the whole of the ten places. Two other propositions to rescind resolutions adopted at previous meetings had obtained precedence as special matters, one of them being the question of erecting a crematorium at Ilford Cemetery, which was carried at the last meeting by a small majority. In consequence of the long time spent in the previous discussions, it was decided to further adjourn the matter. The other motion to rescind, made at the instance of Mr. Royle, was in opposition to the resolution passed on July 17 to pave a part of Upper Thames-street with asphalt. Wood and granite had many advocates as against asphalt, and Mr. Alderman Green elicited the information from the Engineer that an asphalt was known which was not only noiseless, but less objectionable on account of slipperiness than any yet laid down in London. The Engineer said such an asphalt was in the market, but no one had any experience of it in this country. The motion to rescind was eventually carried by 33

against 14, a majority only one over the necessary two-thirds required to rescind a motion.

**NATIONAL REGISTRATION OF PLUMBERS.**—The annual public meeting of the Edinburgh and East of Scotland District of the National Registration of Plumbers was held in the Lecture Hall of the Philosophical Institution, Edinburgh, on the 1st inst. Sir Alexander Christison, Bart., presiding. In the report the Council expressed regret that the Plumbers' Registration Bill had not become law, and mentioned that "the Bill has, as formerly, had the opposition of the ironmongers." The Chairman, in moving the adoption of the report, commented upon the importance of registration, and pointed out that the Public Health, the Burgh Engineers, and the sanitary departments of the city of Edinburgh now insisted on employing plumbers who were registered. Professor Ivson Macadam seconded, and expressed regret that the number of masters coming forward for registration was very small. The report was adopted, after which Sir Douglas MacLagan was elected President, and Mr. Alexander Allan, vice-president.

**BURKE STATUE, BRISTOL.**—On the 27th ult., Lord Rosebery unveiled the statue of Edmund Burke, which stands on St. Augustine's Bridge, Bristol. The figure is of bronze, and is placed on an Aberdeen granite pedestal. Mr. Havard Thomas was the sculptor. The Scotch granite basement is some 12 ft. high. The pedestal consists of seven pieces of Aberdeen granite, and was erected by Messrs. Cowlin & Sons.

**LIVERPOOL FREE LIBRARY.**—We have received a handbook of the books on architecture in the Liverpool Free Library; a remarkable and unusual collection for a general public library, and such as may be partly accounted for by the fact that the late Mr. J. A. Picton, the architect after whom the "Picton Reading-room" was named, had so much to do with the Liverpool Library, and has probably left his traditions behind him. The Handbook is the first of an intended series, which are to make the contents of the library better known to specialists. The librarian Mr. Cowell informs us that a "Handlist of Technical Works" published two years ago and distributed freely through the workshops of the city, had a most marked effect on the issue of that class of books from the library.

**THE BOROUGH POLYTECHNIC INSTITUTE.**—The annual distribution of prizes to the students at the Borough Polytechnic Institute took place on the 1st inst., when the certificates and prizes were given away by Sir B. Samuelson, M.P. Mr. C. T. Millis, Principal of the Educational Department, in his report, pointed out that there had been an increase in the number of students as well as in the actual work done. Moreover, there was a growing tendency to continuity on the part of the students. For the City and Guilds of London Institute examination there were 144 candidates, and of these 92 had passed, 16 obtaining honours. In the Science and Art Department examination 120 students presented themselves, an increase of 57 per cent. over the preceding session, and of these 86 secured passes. In the Society of Arts examinations thirty-two candidates were examined as against nine in the previous session. Eight passed in the second division, and twenty-one in the third. Sir B. Samuelson, in addressing the students, said that the labours of the Royal Commission on Technical Education had been successful mainly on account of the work of the scientific men who sat on it, notably Sir H. Roscoe and Sir P. Magnus. He was glad that so many students gave up so much of their leisure time to perfect their knowledge in their various crafts, thus contributing to the advancement of the crafts and the benefit of the community. The Art schools, originally schools of design, had made great strides forward. This change was due to many men, notably to Mr. J. Bryce, M.P., who had called attention to the City architectural funds lying waste, and to those at the head of the newly-created polytechnics. There were, however, even now, in London, in proportion to population, only one-fifth of the students that were to be found in the great manufacturing towns of the Midlands and the North, but he believed that London was making rapid progress, and that the difference was rapidly diminishing. Comparing our schools with those of the Continent, he said, "we are practical men, the Germans, and we did not attempt, as did the French, to finish the education in the school; that should be done in the economic workshop. The Borough Polytechnic was a new institution, but it was on the right track; it combined practice and science, it paid its teachers for fair work, and yet did not get into debt. In conclusion he appealed to the students to adapt themselves readily to industrial changes, to be versatile, to qualify by the study of other subjects than their own, to form sound judgments, not to be led away by specious arguments, but not to fear new ideas, not to entertain jealousy of capital and employers, but to make use of them, to save so as to become capitalists themselves, for in the co-operation of capital and labour was the solution of the labour question. The prizes were then distributed.

**CONTRACTS FOR SCHOOL BOARD WORK.**—The London Building Trades' Federation have sent a copy of the following questions to all the candidates for the forthcoming School Board elections:—Are you in favour of contractors supplying with each

tender a schedule of the wages paid to the employees, and where found less than the union rates that the tender be not entertained? Are you in favour of the insertion of a clause in all contracts compelling the Board's contractor to regulate the working hours of the London district? Are you opposed to contractors sub-letting any portion of the work to a number of workmen? Are you opposed to any contractor sub-contracting any portion of his contract without the direct sanction of the Board? Are you in favour of the enforcement of a penalty for any evasion of the Board's terms of contract? Are you in favour of the Board, if possible, doing their own work direct, and with the intervention of a contractor? Are you in favour of practical mechanics only being appointed by Board as clerks of works?

**SALE OF BUILDING ESTATE, FULHAM.**—As has been seen from our advertisement pages, Messrs. E. H. Lumley will sell at the Mart, Tokenhouse-yard, E.C., on the 20th inst., the freehold building estate known as "Ivy Lodge," 907, Fulham-road. The estate has frontages to the Fulham-road, and includes an old-fashioned residence, with garden and grounds of nearly two acres.

**THE SANITARY INSPECTORS' ASSOCIATION.**—In connexion with the course of lectures and demonstrations arranged by the Sanitary Inspectors' Association for Sanitary Officers, Professor V. Lewis, F.R.S., F.I.C., delivered the fourth of a series of five "Combustion and the Influence of its Products on Health," at James's Hall, Piccadilly, on Monday evening. The lecturer said that, having shown the members of the Association the actions which went on during combustion, and the part played in combustion the atmosphere, he would turn their attention to some of the results of their action, and to some of the products of combustion which those they had been studying. All the combustibles used practically for fuel purposes contained carbon as the chief constituent. Carbon and hydrogen were the main factors in all the ordinary kinds of fuel, and all the fuels that they commenced were of vegetable origin. Professor Lewis then explained that cellulose was a matter in woody fibre and vegetable growths of kinds, and he described how it was formed, pointed out that woody fibre varied very much in way in which it was packed into plant life, and upon that variation the different kinds of wood almost entirely depended. A very curious fact about moisture in wood was that it seemed to be a point beyond which they could not dry it, no matter how much any kind of wood was dried would generally retain about 20 per cent. moisture. When wood was burned they got more than about 25 per cent. of its weight behind as pure charcoal. The lecturer dwelt upon the very great power of absorption possessed by freshly-burned charcoal, and observed that the property made it of exceptional value for self-traps, respirators, and other purposes where it required the absorption of gases which would of wise be injurious or at any rate unpleasant, they could fit up a trap over the mouth of a street with 3 in. of freshly-burned charcoal, it would allow a trace of sewer-gas to come out for a week, and the baking of the charcoal in an oven would revivify it and give it fresh power for another considerable period. Not only did this absorption go on, but there was a chemical action in charcoal in the direction of the destruction of the gas as absorbed. After mentioning that woody fibre is capable of being converted into several other forms, he pointed out that the professor was largely occupied with the conversion of vegetable matter into charcoal, which he said was an intermediate stage between woody fibre itself and coal. It was afterwards converted into several kinds of coal, and subsequently into hard coal like anthracite, whilst the stage in the change was that it became carbon, or what was known as graphite, black-lead. He exhibited a table showing the gradual change which took place, i.e., the gradual elimination of the hydrogen and oxygen, light the softest coal, being excessively inflammable while anthracite—one of the last stages of the conversion—was a very hard, smokeless coal, which was much less easy to ignite and keep burning. He pointed out that the Sanitary Authority should make his next lecture, which would be "Smoke," more interesting. In further remarks he dealt with the production and effects of gases known as carbon dioxide and carbon monoxide. Professor Lewis will deliver his last lecture next Monday evening.

**SEWERAGE SCHEMES, DUBLIN.**—The Chelsea Street Union Sanitary Authority have instructed Mr. D. Balfour, M.Inst.C.E., F.G.S., Newcastle-on-Tyne, to prepare plans for the sewerage and sewage disposal of Low and Middle Handon Hold, and also Thornton Fold, Urban Sanitary District, in the above Union.

**THE INCANDESCENT GAS-LIGHT WORKS.**—The new premises for the Incandescent Gas Light Company, who are the manufacturers of England of Dr. Von Welsbach's patents, have been completed. The principal advantages of light are known to most of our readers. It consists of a specially-constructed Bunsen burner; over Bunsen or atmospheric flame is suspended a filament or cylinder, technically termed the mantle.



immediately the burner is lighted becomes only incandescent, giving out a clear, soft, and bright light. This mantle, whose process of manufacture was shown, is made of ordinary cotton in the place; it is then passed through a fluid composed of zirconia, thorina, and lanthanum, after it is dried, placed in a strengthening fluid, then by a gas-jet, which effectually destroys the cotton, leaving a gauze substance is then heated over ordinary gas-jet, dipped in collodion varnish, and finally dipped in methylated spirits. The process is carried out on the company's works, where efficient life of a mantle is stated to be four months, or 500 hours actual burning. The mantle was formerly supported in its position by a rod ending in a ring at the top from which the mantle hung. This rod, however, was liable to bow owing to the heat, and this caused some of the breakage of the mantle, or of the keys, or even of both. In the latest improvement, however, the mantle is supported by a central wire of a fire-resisting material which not only cannot burn, but being quickly raised to incandescence, adds to the brilliancy of the light. Apart from details, the interest in the light lies more particularly in the various important advantages it possesses over the ordinary burner. The first place, according to a report by Professor Carlton Lambert, of the Royal Naval College, Greenwich, it is considerably more economical than the ordinary burner, in the market, an important point to consumers. According to Professor Lambert, the Regenerator's burner (No. 7) gives 2½ candles per cubic foot of gas; an Argand burner gives 3½ ditto; a Regenerative burner gives 8 to 10 ditto; a Bunsen burner gives 18 to 20 ditto; and other words, the incandescent gas-light is one-seventh the cost of gas used through ordinary burners, and the use of the incandescent burner and half the cost of a Regenerator. From a hygienic point of view, it also possesses some superiorities over the ordinary burner; it is well known to everybody that burnt through an ordinary burner gives a yellow flame which will quickly deposit carbon on the walls of the burner, as may be seen if you hold a white plate over an ordinary gas-jet, if the same plate be held over an atmospheric burner, such as the incandescent, it remains perfectly white. The light therefore possesses the advantage of electricity in this respect, in preserving the whiteness of ceilings and decorations. The perfectness of the light in comparison with the light of the ordinary gas-burner is at once apparent; its coolness again, compared with ordinary gas may be noted, for, although it cannot be compared with electricity in this respect, it is computed that only one-half to one-seventh of the gas is needed in the ordinary burner is required by this system, and therefore there is a consequent saving in heat to this amount. For the same reason, the generation of carbonic acid gas is reduced to a similar extent. The incandescent burner can be used to any existing gas-fitting. One of the great drawbacks to the system up to the present have been the fragility of the mantle already mentioned, and which is raised to incandescence by the use of the Bunsen burner, but the reduction in the price of the mantle, at the former price has largely modified this objection.

# LEGAL.

## WHAT IS A BUILDER'S FOREMAN?

TUCK & GREGAR & SONS.

CASE which turned on this point was heard by Judge French and a jury at the Bow County on the 2nd inst., which resulted in a loss of £100 to the builders, on a simple legal point. The case, a bricklayer, of Forest Gate, sued Messrs. Gregar & Sons, builders, of Lett-road, Stratford, for £100, for injuries received through negligence of defendant's foreman. The facts are as follows:—On April 30 Tuck was at work on a building, being erected for the West Ham School Board, in Bow Town. The work was being hurried on by J. F. Newman, the architect, was to complete the job on the following day. Tuck was standing on a scaffolding, completing a window arch, when he was struck by a beam of the scaffolding, which came down. He knocked off the scaffolding with a straightedge, accidentally struck the beam on which Tuck was working, and Tuck fell a distance of sixteen feet. He was taken to the London Hospital, five operations were performed on him, and he would never be able to work as a bricklayer again. The facts were £100 per week for the loss of his work, but Mr. Storer, for the defendants, contended that Flegg was a foreman within the meaning of the Act. He then an under-foreman for eleven months, taking the work from the clerk of the works, and giving them bricklayers; but for eight days preceding the accident he had been doing manual labour; therefore at the time of the accident, he was not a foreman, as the Act required, but an ordinary workman, and defendants could not be held responsible for his negligence towards a fellow workman. Mr. Morton, for plaintiff, contended that as the defendants took their orders from Flegg, he must be their foreman. If he assisted in the work for eight days, because the firm was pressed, that

did not disentitle him, as his wages were those of a foreman.

His Honour, in summing up, said it was not a question so much of law, as of fact, as to whether Flegg was a foreman at the time of the accident.

The jury returned a verdict for plaintiff for the full amount, £200, and his Honour certified for full costs.

## A DISHONEST FOREMAN.

FALSIFYING PAY-SHEETS.

At the County of London Sessions (north of the Thames), sitting at Newington *pro tem.*, before Mr. Loveland-Loveland, William O'Keefe, 38, carpenter, was, on the 29th ult., indicted on several counts for stealing certain sums of money, the property of William Scrivener and others, his masters; for attempting to steal other sums; for conspiring with others in stealing the same; and for making false entries in certain accounts with intent to defraud. Mr. Bodkin, instructed by Mr. F. Freke Palmer, appeared on behalf of the prosecution.

The prosecutors are Messrs. William Scrivener & Co., builders and decorators, 18, Fitzroy-road, Regent's Park. In July last the firm had a contract to clear away certain debris and rebuild on some ground in Whitfield-street, Finsbury; and on the 10th of that month the prisoner was engaged as general foreman on that job, at £35 a week. It was his duty to engage and discharge men, and superintend the making-up of the time-sheets, for which he was responsible. These were sent into the office at the end of the week, and on Saturday a pay-clerk was sent to pay the men the amounts on the time-sheet, which the prisoner would call out as each came forward. There were about eighty or ninety men on the job, and the wages would come to about £100 a week. On July 28, an under-foreman, named Punched, who had been in the employ of the firm from a boy, and had been temporarily in charge of this job until the prisoner's appointment, informed Mr. J. W. Scrivener that something was wrong. Punched was therefore removed from the job, and the duty of making out the pay-sheets devolved upon the prisoner, who was summarily discharged on August 4, and had since made no application for the week's wages he could have claimed in lieu of notice; in fact, he went to Brighton, where he was apprehended on a warrant on September 8. When engaged the accused produced first-class testimonials as to character, extending over twenty years.

The evidence of Henry Punched, under-foreman, was to the effect that it was his duty to make out the time-sheets under the prisoner's direction. On Thursday, July 26, a man named Stevens was discharged by the prisoner, under whose directions witness gave him a ticket for £1. 8s. 2d., which he drew.

In making out the pay-sheet on the following day, witness marked Stevens as "paid off." On the Saturday a strange man came up to the pay-box and gave the name of Stevens (No. 72), the name and number of the man who had been paid off on the previous Thursday. The pay-clerk, who had previously been spoken to, objected to pay the man, and on being asked by the prisoner as to whether the man had been at work or not, the witness replied that he had not, and that the real Stevens had been paid off on Thursday. Prisoner thereupon said there was some mistake, and there must be two Stevens on the job. He then requested the clerk to pay the man, saying he would be responsible, and the man received £1. 8s. 2d. Witness was perfectly certain that man had never worked there at all. On the following Monday prisoner spoke to witness about Stevens, saying it was a bad job. Witness replied: "You know as well as I do the man was not working." To which prisoner replied: "Well, if he wasn't working on the job, you might have said he was; anyhow, here's a quid for you" (handing him a sovereign). Afterwards prisoner said:

"I'm going to have some money over this job. I don't care whether I get the sack or get locked up; I've had £12 a week over smaller jobs than this." In another case a man nicknamed "Punch," who had never worked at the place, drew money in the name of Green. Next morning prisoner said to witness: "That came off all right last night; here's a dollar for you" (handing him 5s.). When witness returned after being absent, and the pay-sheets had been made out by the prisoner, the latter asked him to ink over the names of four men that he (prisoner) had put down in pencil on the sheet but who had not been working at all. Witness refused, and on the following Saturday pay for these four men was refused. The first of those who came up to the pay-box was spoken to, upon which he and three more who had been loitering outside disappeared. In another case a man applied on a Saturday to the prisoner for a job. Prisoner said he could not put him on then, but might be able to do so on the following Monday, but told the man to stay about as he would be useful about twelve o'clock. That man was afterwards paid for a week's work as Manning. It was the same man "Punch" who had drawn in the name of Green, and the following week wanted to be paid again as Manning.

This evidence was borne out by Mr. Cloutman and Mr. G. Bass, clerks in the employ of Messrs. Scrivener. The former spoke of the man called "Punch," whom he recognised when he came for money in the name of Manning, as having pre-

viously been paid off twice, once as Green and next as Stevens, while Mr. Bass spoke as to two men claiming pay, one as Jeffries and the other as Jeffrey, only one of them having been at work. James Hacotree, scaffolder, also gave corroborative evidence. He collected tickets from the men, and had seen some paid who had not worked. Evidence to the same effect was given by Andrews and Coxon, two men who had also been employed on the same job, and this concluded the case for the prosecution.

Prisoner called one witness, Mr. Thomas Hazell, 64, Rockingham-street, Newington-causeway, who said he was with the prisoner outside the works in Whitfield-street, on July 28, when a man giving the name of Manning came up and asked O'Keefe if his money had been left. O'Keefe said "yes," and handed the man something wrapped in paper.

In his defence the prisoner addressed the jury at considerable length, urging that if there had been any mistakes in the time or pay-sheets it was owing to the defective system with which Punched, who looked after them in the first instance, had kept his accounts. All the blame was attributable to Punched and not to him (prisoner). The only money that had passed between him and Punched was £1. 10s. repaid, which he had previously borrowed. Punched knew about the man called "Punch" getting the money, but had deliberately perverted the matter before the Court, and he knew also the men whose names had been left off the sheet. If the prosecutors had been defrauded, it was owing to the careless way in which the sheets were kept. It was not likely that with his twenty-five years good character he would put himself in the power of these men for a few shillings when any one of them might turn round and ruin him in a moment.

Mr. Bodkin having replied on the points raised by the accused in his defence.

The learned judge, in summing-up, said this appeared to be a considerable contract undertaken by a large firm and required careful supervision. The witness, Punched, knew perfectly well the prisoner was coming to superintend the job, and there could be no question of jealousy as had been suggested. He was sorry to say that there had of late been a number of cases in which time-sheets had been inaccurately kept, sometimes for fraudulent purposes. It had been reported to Messrs. Scrivener that certain persons had been drawing money from their works who had never worked there, and the firm would have failed in their duty to the public had they not taken action in the matter, which they were told by an old and trusted servant what was going on. His Lordship went on to point out the prisoner's dealings with Punched, who appeared to have done all an honest man should do in the interest of his employers, who sent him away from the work for a time, in order that prisoner himself might have to make up the sheets, and his accuracy and honesty might thus be tested. What the result was they had heard. He failed to see what good the prisoner's witness had done for him, for if the prisoner had paid a man named Manning anything out of the usual course and not through the pay-clerk, the jury had a right to ask themselves whether it was not that man's share of what he had helped to defraud Messrs. Scrivener of.

The jury found the prisoner guilty.

His Lordship said all who had listened to the evidence must agree with the verdict. Plaintiff had been guilty of atrocious scoundrelism and had made his case worse if possible by the way in which he had attempted to throw dirt and discredit upon the principal witness against him without the slightest warrant for so doing. The man Punched had borne his evidence well and the jury thoroughly believed him, though the prisoner had tried to blast his character and suggest that he had made the charges through spite. He sentenced the prisoner to twelve months' hard labour.

## CAPITAL AND LABOUR.

DISPUTE IN THE LONDON BUILDING TRADE.—A dispute has arisen in the London building trade between the Master Builders' Association and the London Building Trades Federation, and has resulted in 300 men leaving their work. The masters contend that at the conclusion of the great strike of 1892 it was mutually agreed that the unionists should work with the non-unionists, and that the employers should make no distinction between the two classes of workmen. The masters allege that while they have kept to their part of the agreement the unionists have again and again refused to work with non-unionists, and they have, therefore, through the Master Builders' Association, given the Federation notice of their intention to terminate the 1892 agreement on May 1st next year, thus giving the six months' notice which was stipulated in the agreement. On the 1st inst. Messrs. G. Trollope & Sons, builders, of Grosvenor-road, S.W., engaged some men who were non-unionists for one of their jobs; the unionist carpenters, bricklayers, and plasterers at once left the building. Before the day was out the unionists at work on jobs in Duke-street, Mount-street, Park-lane, and Portman-square had also struck. There has been a further extension of the strike, and other jobs of the firm in Cadogan-square, Belgrave-square, and at Stafford House were struck against. In all nearly 300 of the unionist employees of the firm have struck work.







A. Reed & Son	36,426	Stimpson & Co.	33,495
L. Shillite & Son	34,600	E. Lawrence & Sons	33,395
W. Brown & Sons	35,725	W. J. G. & Sons	33,950
W. Downs	35,775	Kirk & Randall, Wool-	
F. Collinson	34,550	wich*	31,324

\* Recommended by the Works Committee for acceptance.





# The Builder.

V. L. LXVII. NO. 2792

NOVEMBER 27, 1904.

## ILLUSTRATIONS.

Entrance to Hall, Institute of Chartered Accountants.—Mr. John Belcher, F.R.I.B.A., Architect .....	Extra Large Ink-Photo.
Design for New Church of St. Aidan, Walton-le-Dale.—By Mr. A. H. Skipworth .....	Double-Page Ink-Photo.
House at El-tree.—Mr. T. E. Collcutt, F.R.I.B.A., Architect .....	Single-Page Photo-Litho.
House at Fifield.—Mr. T. E. Collcutt, F.R.I.B.A., Architect .....	Single-Page Photo-Litho.

## Blocks in Text.

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### Hours of Labour and Artisans' Dwellings.



HE interesting and important speech which Mr. Chamberlain recently delivered\* on various social subjects may probably be regarded as being indicative, to some extent, of the

endency of the policy of any Government which Mr. Chamberlain may hereafter long, in regard to the subjects on which he has spoken. Some of them are not within the range of subjects which are commented on these columns, but others have from time to time been referred to here. These subjects may be summarised as those of Artisans' Dwellings, Provision for Old Age among the Working Poor, Trades Unionism, the Hours of Labour, and Employers' Liability. Dealing first with the question of the hours of labour, it is satisfactory to find that Mr. Chamberlain still opposed to the legislative limitation of the hours of labour in the way to eight as a general principle. To this principle Mr. Chamberlain admits two exceptions: "where the labour is so excessive that it constitutes a danger to the worker, to his health and condition, and where directly, as in the case of some classes of railway servants, it may constitute an interference with the security of the public." The second exception is "the case of those trades in which, by some improvement of machinery or by some greater exertion on the part of the workmen, the same amount of production may be obtained as at present, with less expenditure of time." The first exception is certainly a sound one: it rests on exactly the same principle as underlies the Factory Acts, and similar legislation. Again, if it is safe for a signalman to be on duty above a certain number of hours, obviously the Legislature, in the interests of the public, is justified in fixing some limit to the length of railway servants' day. But the second exception is one which does not appear to be likely to be acceptable to capitalists, nor do we see how it could properly be carried into effect. The idea which underlies it appears to be that, if, by improved machinery,

\*It may be mentioned that these remarks were written immediately on the delivery of the speech referred to, or four weeks ago, but our space was too much limited at the time for their insertion. The subjects of speech, however, are not of ephemeral interest, and are worthy of further consideration.

the employer can get the same return from a workman's labour in eight as in ten hours, then Parliament may interfere, and order some limitation of the hours of labour. But the first question which suggests itself is, Why is the present output of labour to be taken as a permanent standard? For example, as we understand Mr. Chamberlain, if a stonemason can now turn out two finished pieces of material in a day of nine hours, and by some improved machinery he is able, a year hence, to turn out the same amount in a day of eight hours, then eight hours ought to be fixed as the length of the day. But if this were done, all the commercial advantages which arise from improved machinery would cease. Indeed, if the exception is considered carefully, it appears to be unsound in theory and impossible of practical application. It may be, of course, that Mr. Chamberlain's meaning has not been understood. We can, however, only take his own words, and we confess that the more they are considered the more crude does the idea which underlies them appear as regards this particular exception. When a statesman of Mr. Chamberlain's position presents us with a social programme, the results of which may have grave results, it is necessary to consider his utterances with care.

On the subject of Trades Unions, or more strictly, on the question of strikes, Mr. Chamberlain put forward a very definite proposal. "I should propose," he said, "that there should be created in every industrial centre an impartial and judicial tribunal of arbitration. I should propose to give to it all the authority and dignity of a court of law. I should suggest that it be presided over by a judge, who should have a similar position and a similar salary to the Judges of the High Court, and who should sit attended by assessors chosen for the purpose of each dispute." We have some doubt whether Mr. Chamberlain has quite thought out this proposal. It would mean the creation of a number of highly-paid official arbitrators all over England, arbitrators by profession, so to speak. Would the country be willing to submit to this great expense? If it were, would it get value for its money? We have on previous occasions indicated our approval of the principle of employers and workmen in a particular trade agreeing to abide by the award of a permanent arbitrator. But we have never been able to see how matters would be made to move smoothly by the appointment of a Govern-

ment arbitrator. It is very important that the arbitrator should command the confidence of both parties. But would this be the case if the Government appointed permanent arbitrators as they now appoint judges? When a man goes to law, the defendant is brought before the judge to which the cause is assigned, willingly or unwillingly. But in an arbitration he can agree to his tribunal. It would be a ridiculous spectacle to see Government arbitrators solemnly appointed, and to find that their services were respectfully declined. We should have been glad to hear Mr. Chamberlain give detailed reasons for this particular form of arbitration in trade disputes. Merely to put forward a particular scheme without argument will not advance it. Mr. Chamberlain may be able to justify his proposal: we hope on some other occasion he will do so.

We pass over the question of a provision for the old age of the working man; it is very important, but cannot be adequately dealt with in connexion with other subjects, and we turn to the proposal "by which the working classes of this country, and especially the artisans of the towns, may be enabled to become the owners of their own dwellings upon comfortable terms." The means are simple: the State is to lend the artisan the money to buy his house, as it lends the Irish farmer money to buy his holding. Mr. Chamberlain further indicated the source from which the money is to come, namely, from the Post-Office Savings Banks. The first question which at once suggests itself is, why is the artisan to have these facilities to purchase a house given to him in preference to other classes of the community? Why is not the clerk to be equally favoured, and if the clerk, why not the struggling professional man? It is just as desirable that the clerk should be enabled to purchase his house "on comfortable terms" as that the artisan should do so. We are not arguing against giving facilities to men to become owners of their own dwellings, but we fail to see why Mr. Chamberlain draws the line at the artisan. No doubt the principle of advancing money by the State to private persons has been sanctioned in the case of the Irish farmers, and recently the Legislature has allowed public money to be advanced by local bodies to agricultural labourers to purchase small holdings. In the case of Ireland it has been done for high purposes of State policy—to pacify a people, to assuage a craving for ownership which could not

otherwise be satisfied. In the case of the agricultural labourer it has been done with the hope of lessening the great national loss resulting from agricultural depression and to prevent the movement of the rural population to the towns. It is doubtful if in the last case the principle was justifiable. But be that as it may, there is no great State reason for the State becoming a money-lender to the artisan. It may be that the State might reasonably lend money on good security to any person, but at present there is certainly no reason why it should favour the artisan only. But we are by no means sure that in many cases it would be to the advantage of an artisan to become the owner of a house. He is not, like the farmer, fixed to one spot; rates may be raised, work may shift, and it is much more convenient in such cases to be able to remove himself and his goods than to find he must either leave his work or his house. Again, there are such things as building societies, by means of which thrifty artisans and others earning small incomes are enabled to buy their own houses. We should much prefer to see such voluntary agencies encouraged and placed on a sound footing before the State steps in and begins to lend the eighty millions which are invested in the Post Office Savings Banks. Mr. Chamberlain instanced the Leeds Building Society, "a very large, a very old-established, and a most admirable institution," as one in which the cost of management does not exceed six shillings per cent. But if this society "has been conducted to the great advantage of the people of Leeds and the surrounding neighbourhood," why is it to be superseded so far as Leeds goes by the State? There are numerous difficulties in the way of the State becoming a gigantic lender of money, but so far as regards Mr. Chamberlain's present scheme, it is clear that it is faulty in principle, since it cannot be fairly confined to a single class. That the Artisans' Dwellings Acts might be amended so as to give public bodies greater facilities in carrying them into effect is quite probable, this is another suggestion which Mr. Chamberlain makes. He also appears to desire that property for the purpose should be purchased at the time when property is bought for general improvement. It is not clear why the making of a square should be combined with the erection of artisans' dwellings, and we should have been glad if Mr. Chamberlain had gone into greater detail on this point. The difficulty of carrying out many social schemes is not appreciated until details are fully considered, and we doubt if Mr. Chamberlain will be enabled to work out his programme unless he faces the difficulties of it more than he appears yet to have done.

## STRENGTH OF ARCHED IRON RIBS.

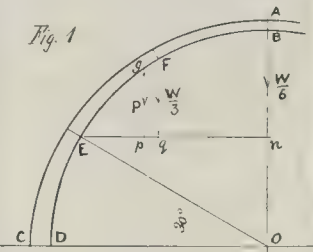


CIRCULAR ribs of wrought-iron being frequently employed for roofing purposes, it is desirable to find a simple method for obtaining the dimensions of its section, which will suffice to resist the stress arising from the loads placed upon it. We shall assume that the arch is a semi-circle, and the section is of I form, having equal flanges. Since the longitudinal compression on the rib increases from the crown downwards towards the springing, it is evidently economical to make the depth of the rib also increase in the same degree, and we therefore make the depth at the crown half that at the springing.

In the stone arch, it is found that the *joint of rupture* in a semi-circular arch is the one that makes an angle of 30 deg. with the horizontal; and although an iron arch is not divided into separate voussoirs as a stone one is, yet we may consider that the point E is the *point of rupture*, where EO makes 30 deg. with OD; and it is about this point that we have to take the *moment of stress* and the *moment of resistance* of the section at E.

First. Let the arch have a span of 20 ft., the ribs being 12 in. deep at base and 6 in. at crown, and placed 5 ft. apart, and loaded by means of purlins fixed at A, F, E, and D (fig. 1). Suppose the load to be taken at

Fig. 1



$\frac{1}{2}$  cwt. per foot of roofing, including weight of snow and pressure of wind, as well as covering. Then W being the load on half the rib, we have in this case

$W = 16\frac{1}{2} \times 5 \times \frac{1}{2} = 42$  cwt., of which  $\frac{1}{2}$  W is borne at A and at D, and  $\frac{1}{2}$  W at F and at E. Let P be the weight of the rib AE,  $g$  its centre of gravity at which P acts; then we find  $P = 2\frac{1}{2}$  cwt., and the lever arm  $Eg$  is 36 in.

The *moment of stress* (M) of all the loads, taken about E, is

$$M = \frac{W}{6} (En + 2Eg) + P \times Eg \\ = 7 (105 + 90) + 2\frac{1}{2} \times 36 \\ = 1455$$

The *safe moment of resistance* ( $M^2$ ) of the section at E, is

$$M^2 = \frac{100}{6D} \{ bD^3 - (b-t)d^3 \}$$

where D is the depth in inches of the rib at E,  $d$  the depth of the web between the flanges,  $b$  the breadth of the flanges,  $t$  the thickness of the metal.

We have now to find what dimensions must be given to this section in order to make  $M^2$  either equal to or greater than M, and this can only be done by trying different dimensions, but two or three trials will generally be enough. Let us take  $D = 9\frac{1}{2}$ ,  $d = 8\frac{1}{2}$ ,  $t = \frac{3}{8}$ ,  $b = 3\frac{1}{2}$ ; then

$$M^2 = \frac{100}{54} (3\frac{1}{2} \times 729 - 3\frac{1}{2} \times 562) = 1474 = M + 19$$

As the value of  $M^2$  is just over that of M, these dimensions will suffice for safety.

The purlins may be taken as of I section, and since the load on each will be 14 cwt. distributed, a section of  $3\frac{1}{2} \times 3\frac{1}{2} \times \frac{1}{4}$  will be found sufficient.

Secondly. Let the span be 30 ft. (fig. 2) and the ribs  $7\frac{1}{2}$  ft. apart, 16 in. deep at base and 8" at crown. Here we have  $W = 93$  cwt., distributed by purlins at 5 points, B, F, G, H, and D;  $\frac{1}{2}$  W being borne at B and at D, and  $\frac{1}{2}$  W at F, G, and H. The load on each purlin is therefore  $23\frac{1}{2}$  cwt.

P, the weight of rib AE, is here  $6\frac{1}{2}$  cwt. acting at  $g$ , and the lever arm  $Eg$  is 60 in. The *moment of stress* about E is

$$M = \frac{W}{8} (En + 2Eg + 2Er) + P \times Eg \\ = \frac{93}{8} (156 + 174 + 57) + 6\frac{1}{2} \times 60 \\ = 4,890$$

For the *safe moment of resistance* at E, we take  $D = 11\frac{1}{2}$ ,  $d = 10\frac{1}{2}$ ,  $b = 6$ ,  $t = \frac{3}{8}$ , and we have

$$M^2 = \frac{100}{6D} \{ bD^3 - (b-t)d^3 \} \\ = \frac{100}{69} (6 \times 1521 - 5\frac{1}{2} \times 1077) \\ = 4835 = M - 55$$

Here  $M^2$  is less than M, but the difference is so slight that we may consider these dimensions sufficient for safety.

As each purlin carries  $23\frac{1}{2}$  cwt. distributed, and the span is  $7\frac{1}{2}$  ft., it will be found that their dimensions should be  $5\frac{1}{2} \times 5\frac{1}{2} \times \frac{1}{4}$ .

Third. Let the span be 40 ft., and the distance apart of the ribs 10 ft.; the depth at base being 22" and at the crown 11". The load W will be 195 cwt., distributed by purlins at 7 points, B, F, G, H, E, K, and D;  $\frac{1}{2}$  W at B and D, and  $\frac{1}{2}$  W at F, G, H, E, and K; the load on each purlin is 33 cwt. P is found to be 14 cwt. acting at  $g$ , and the lever arm  $Eg$  is 78 in. (fig. 3).

Fig. 2

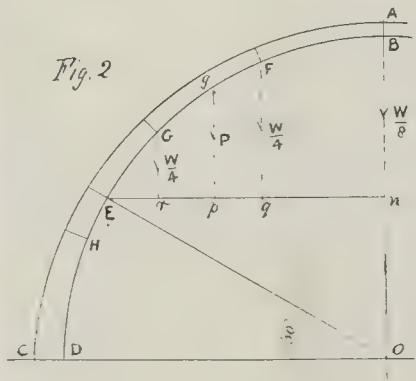
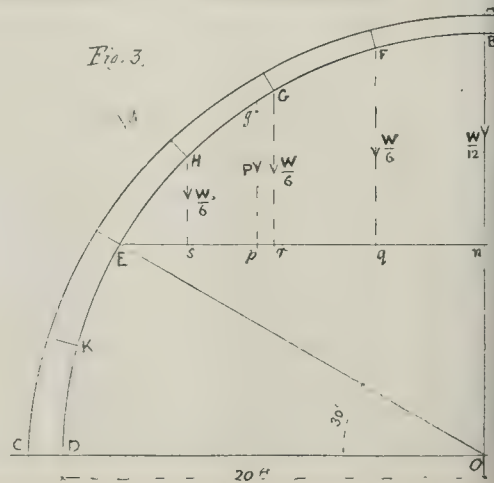


Fig. 3.





the moment of stress about E is

$$= \frac{W}{12} (En + 2Eq + 2Er + 2Es) + P \times Ep \\ = \frac{195}{12} (208 + 294 + 176 + 76) + 14 \times 78 \\ = 11,395$$

or the moment of resistance about E,  
 $D = 16\frac{1}{2}$  in.,  $d = 15$  in.,  $b = 8$  in.,  $t =$   
 1; then the safe moment of resistance is

$$M^1 = \frac{100}{6D} \{ b D^3 - (b - t) t^3 \} \\ = \frac{100}{99} (8 \times 4493 - 7\frac{1}{2} \times 3375) \\ = 11591 = M + 196.$$

ere the value of  $M^1$  slightly exceeds that  
 $M$ , and we may therefore conclude that  
 above dimensions will suffice for safety.  
 he load on each purlin being  $32\frac{1}{2}$  cwt.,  
 the span 10 ft., it will be necessary to  
 their dimensions 6 in.  $\times$  6 in.  $\times$   $\frac{3}{4}$  in.  
 he strength of ribs of larger span can be  
 ulated in exactly the same manner; but  
 n there is a considerable number of  
 ins it will save trouble to take the whole  
 re of the rib from A to E as acting at its  
 re of gravity  $g$ , including the weight of  
 part of the rib itself. The maximum  
 ss per square inch of section is here  
 n at 5 tons.

### NOTES.

THE agenda-paper for the last meet-  
 ing of the London County Council  
 contained a long series of standing  
 orders or "Regulations" under  
 London Building Act, to be adopted in  
 connexion with the new Building Act. The  
 priority of these are merely the replacing of  
 existing regulations, with such alterations  
 of references, &c., as would fit them to the  
 new Act. They have not yet been discussed,  
 but were adjourned to the next meeting,  
 in the hope that some points will be re-  
 sidered. In the regulations as to naming  
 and numbering of streets, nothing is said  
 about adopting any uniform and approved  
 material for lettering; a matter of im-  
 portance, which has been long and  
 countably neglected. A much more  
 important matter is, that we observe with  
 regret that the County Council  
 proposing to re-enact the most  
 wise and retrogressive regulations which  
 were introduced some time ago in regard to  
 the office of District Surveyor, making it a  
 condition that he should not practise as an  
 architect; in fact, reducing him to a mere  
 official. From the fact that all mention  
 of such restriction is avoided in the new  
 Building Act, and even (as we have already  
 observed) a special clause inserted (or in-  
 serted) providing for the case of a District  
 Surveyor having to get his own building  
 altered, we had hoped that the Council had  
 at least the error of their ways in this respect—  
 a error feelingly deplored also by the  
 President of the Institute of Architects in his  
 opening address last week—and that they  
 intended to return to the old policy of appoint-  
 ing architects of high standing and long expe-  
 rience as District Surveyors. Unhappily, it  
 was the intention to retain the regulation  
 introduced to the County Council thus stultic-  
 ing the wording of their own Building Act,  
 permanently reducing the position and  
 value of the District Surveyor from what  
 it used to be under the old *régime*. There  
 will be time to reconsider this, and we hope  
 it will be reconsidered. The Council may  
 depend upon it that an independent architect  
 standing and practice, acting as a District  
 Surveyor, will be a far more able judge of  
 what is being done; will command far more  
 respect from architects, builders, and build-  
 owners; and will be regarded as much  
 more above any temptations to partiality or  
 undue influence of any kind, than a surveyor  
 who is a mere servant of the Council.

CONTRARY to all expectation, Philæ  
 has been saved, and the Nile reservoir  
 to be built to the southward of it. It

will, however, always be a kind of discredit  
 to this country that our own engineer should  
 have gone into the subject with apparently  
 not only an utter indifference to Philæ, but a  
 kind of settled craving to destroy it, coupled  
 with the ridiculous proposal to raise the  
 island and temples; and that it was the  
 French engineer who refused to have anything  
 to do with any scheme which would involve  
 the ruin of Philæ. Hence we may measure  
 the distinction in such matters between the  
 tone of public feeling in England and France;  
 for both engineers knew that the public feel-  
 ing of their respective countries would back  
 them up in their very opposite views. The  
*Times*, in a leader on Monday, while  
 chronicling the result, indulges in the usual  
 British sneer at the expense of those who  
 showed some sense of the value of any ancient  
 architectural relics; "Perish material pros-  
 perity, cried the other side, if it is to be  
 purchased by an act of Vandalism," &c.  
 Mr. Cecil Torr, in his reply to this remark,  
 published a day or two later, certainly  
 scores. The archaeologists, he observes,  
 were relying on the Report of the Inspector-  
 General of Reservoirs under the Egyptian  
 Public Works Department, who gave an  
 estimate of 1,900,000*l.* for the Assouan dam  
 and 2,100,000*l.* for that south of Philæ,  
 coupled with an estimate of 200,000*l.* for  
 removing the temples in the former case.  
 "Mere archaeologists," says Mr. Torr,  
 "could hardly be expected to see that the  
 material prosperity of the country would be  
 endangered by the expenditure of 2,100,000*l.*  
 in a single sum instead of separate sums of  
 1,900,000*l.* and 200,000*l.* respectively."

THE dry bones of the Burlington House  
 colonnade are stirring again. This  
 time it is a lady, Mrs. Courtney, who has  
 drawn attention in the *Times* to the fact that  
 the London County Council are at last doing  
 something with the unfortunate relics; but  
 alas! not to any right purpose, if it is true, as  
 Mrs. Courtney affirms, that the columns are  
 being taken away to be used in different  
 parts of London. In that case the County  
 Council are the greatest Vandals of all, for  
 they are permanently destroying the colonnade  
 as a colonnade, and all its historical and  
 architectural value. Wherever it is  
 set up, it should be set up as a whole.  
 Mr. W. White writes to the *Times* men-  
 tioning a scheme of his own to work the  
 colonnade into a church in Renaissance  
 style, but we do not think that is the  
 thing to do with it. The whole might very  
 well have been set up in its old semi-circular  
 form to flank one of the entrances to a public  
 park, either at Battersea or elsewhere. In  
 this way it would have done very well; but  
 then another critic, "A. F. C.," writes to the  
*Times* to complain that Battersea Park is  
 "rural," and that its charm would be spoiled  
 by the introduction of the colonnade. If  
 "A. F. C." studies the works of Claude, he will  
 see that one eminent painter, at least,  
 thought that nothing went better with  
 trees than Classic columns, as a matter  
 of picturesque effect. It is remarkable  
 that in spite of Mrs. Courtney's charge  
 against the London County Council in  
 regard to their supposed procedure in dis-  
 membering the colonnade, that body has  
 not thought it worth while to make any  
 statement or explanation as to what it is  
 doing. In the absence of any contradiction  
 we may assume that the statement as to the  
 dispersal of the columns is correct. In that  
 case the Council are finishing up a long  
 neglect of an interesting architectural relic  
 by maltreating it in the very worst way they  
 possibly could. But the only thing that is  
 quite certain about the treatment of such  
 matters in England is that some kind of  
 blunder will be made; and one could hardly  
 expect the case of the Burlington House  
 colonnade to furnish an exception to the  
 rule.

LORD SALISBURY'S speech last week  
 in the municipal government of  
 London was a distinct pronouncement in

favour of separate municipalities for the  
 Metropolis, with a body such as the present  
 County Council to deal with some of the  
 larger questions, which could not be properly  
 allotted to separate bodies. In other words  
 —as we understand the speech—the Corpora-  
 tion of the City and the County Council  
 would be left pretty much as they are, and  
 the vestries and District Boards would  
 be abolished, and in their place would  
 be placed some Municipal Corporations,  
 fewer in number and more important in  
 character. This appears to be a feasible  
 and a reasonable scheme of reform; it would  
 give the localities of London better governing  
 bodies, and it would leave the County  
 Council its present functions, such as those  
 of administering the Fire Brigade, which is  
 an affair common to the whole Metropolis.  
 It would also preserve more or less in its  
 present form the Corporation of the City.  
 Of course, it would not please those who  
 wish to see the whole of London governed  
 by one great Council, but as we have already  
 asked, What is the practical advantage to  
 be gained from such a body?

THE three extensive fires of Friday and  
 Saturday last should again serve  
 London as a warning of the great risk it  
 runs. As we have several times observed,  
 the Metropolis cannot always expect to only  
 have its big fires in calm weather. If there  
 is a gale of wind for a big fire starting, say,  
 in Houndsditch, Bunhill Row, or some other  
 notably dangerous quarter we must expect a  
 catastrophe, and the effect of two such fires  
 would probably mean an enormous national  
 loss. It is high time that steps be taken to  
 prevent, for instance, timber storage in our  
 very midst, and the isolation or division of  
 "risks" should be given more attention. If  
 the Building Act does not suffice, why not  
 have a Fire Act, as in Continental countries,  
 with their system of fire-surveys adopted for  
 our requirements? Danger to life is on the  
 increase, and the national losses through fire  
 are enormous. Even if we had a complete  
 fire-brigade establishment, its powers are  
 limited where there is such recklessness as in  
 London; and whilst the fire at the Minorities  
 was raging on Saturday, the rest of London  
 was again practically quite unprotected.  
 The men who attended the fires last week  
 were handled better than before, and more  
 engines seem to have been turned on at the  
 first alarm than formerly, which is a great  
 improvement. In the case of the Minorities  
 fire the absence of a good tactician was, how-  
 ever, much felt in the beginning.

IN the report on the Forestry Exhibit,  
 prepared by Major Hotchkiss, of  
 Staunton, Virginia, who was one of the  
 judges at the Chicago Exhibition, an  
 interesting fact is given regarding the  
 age of white oaks. In 1737 a patent for  
 10,000 acres of forest-land in Virginia was  
 surveyed, and the usual mark, probably  
 a large knife, was blazed on the trees.  
 Major Hotchkiss has found five corner trees  
 thus blazed, and has cut off blocks showing  
 the mark made at the time of the survey,  
 and also showing rings of growth from the  
 point of the original mark, which rings cor-  
 respond in number with the 107 years which  
 have passed since the patent was surveyed.  
 The average growth in white oak is only  
 about 0.04 in. (four-hundredths of an inch)  
 a year. The marks are as sharply defined  
 as the line where two different kinds of wood  
 are joined, and yet the outside of the trees  
 scarcely shows the trace of the mark. In  
 that region there are trees ranging in  
 diameter from 18 in. up to 11 ft., and it is  
 thought probable from these facts, as revealed  
 by these sections of wood and from careful  
 observations made by Dr. Hopkins, of the  
 West Virginian Station, that some of these  
 trees are over 1,800 years old.

OUR contemporary, the *Deutsche Bau-  
 zeitung*, comments strongly, and with  
 reason, on the unfortunate parsimony shown



by the Bavarian Government in respect to the sculptural decorations for the new Central Law Courts at Munich. Professor Thiersch's design for this building is in the highly-decorated German Renaissance style, which is practically dependent on sculpture, but the sculpture-work is now to be reduced to a minimum, whilst the main design is not to be remodelled. The result will be most unsatisfactory, and by no means in keeping either with the surroundings of the building or the traditions of the Bavarian capital, which has always been known for its liberality in artistic matters. Munich prides itself on being the art centre of Germany, yet its legislators cannot find more than 5,000*l.* for the sculptural decoration of a building costing 300,000*l.* Originally the building was to have cost 450,000*l.*, and 20,000*l.* was allowed for sculpture. We should not be surprised if these figures were finally reached in the form of the extra lists so common on foreign public buildings, but it would be better if the authorities frankly acknowledged the necessity of the outlay beforehand.

IT appears that the circular in regard to the adulteration of cement, to which we alluded last week (page 326 *ante*), resulted in a meeting of manufacturers and those interested in Portland cement at the Cannon-street Hotel on Monday, at which an Association was formed, every member of which is to sign a statutory declaration on oath, to the effect (after stating the firm he represents) that he, as managing acting partner or resident manager of the firm or company named, declares that he is well acquainted with the practical manufacture of cement as carried on by the said firm (or company), and that, according to the best of his knowledge, information, and belief, the said firm (or company) have not on any occasion during the last three years, or within his knowledge at any other time, brought to and added to the calcined product of the kiln, in passing through the crushers, or mill-stones, or grinding machinery, or any other subsequent process, a separate supply of raw Kentish rag-stone, other stone, furnace or oven ashes, disused or exhausted fire-bricks, or any other material, so that such added material would be ground, sifted, or mixed together with the cement and form part of the cement powder; nor sent out, and sold the cement in this state. The form of declaration to this effect was signed on the spot by the representatives of four well-known firms. Further results we have yet to hear. It is stated that information produced at the meeting showed that adulteration of Portland cement has been carried on much more largely than had been previously supposed.

THE instructions to architects issued for the competition for a new school for the School Board of Weston-super-Mare evince a business-like desire on the part of the Board to get as much as possible out of the competing architects, and give them as little as possible. The drawings are to be to  $\frac{1}{4}$ -in. scale—a working-drawing scale, larger than is necessary for competition drawings. The Board do not bind themselves to accept any plan as sent in, and will not be debarred from adopting any improvement which appears in any plan not accepted, nor will they in such case make any compensation to the architect whose idea may be adopted (this immoral provision is imitated from the terms of another competition on which we recently commented; and no doubt, the example once set, it will be followed by other competition committees). No premium is offered, and the architect who has the good fortune to satisfy the Weston-super-Mare School Board will have to make 5 per cent. pay for any kind of extra work that may be involved, beyond the contract work, and will have the privilege of paying for his own journeys. This last extortion is also, as far as we have

observed, a new variation in competition conditions. What sort of architects does the Weston-super-Mare Board expect will compete under such conditions as these?

SCARCELY had the foregoing remarks been written, when we received from another architect another specimen of competition conditions, equally edifying. This is from a committee for building a Presbyterian chapel at Portmadoc. It sets out with the inspiring announcement "Style to be the Gothic, with a spire." The committee word it "the Gothic," as old English writers used to speak of "the Mathematics." The chapel is to seat 300, with school-room accommodation for 150, and the entire cost is not to exceed 1,750*l.* "In order to ensure this," it is naively added, "the estimated cost should be kept well within this figure." "Prizes" of 15*l.* and 5*l.* will be awarded to the best and second best design provided they fulfil the conditions, "particularly as to cost." To make things a little cheaper, it is proposed to employ the architect of the selected design at a commission of 4 per cent. on the contract price, in return for which liberal treatment the general and detail drawings, specifications, &c., are all to become the property of the Committee, and the architect is to have the privilege of paying his own travelling-expenses while superintending the work. This system of requiring the architect to pay his own travelling-expenses is a new attempt at imposition which is creeping into competition conditions, and ought to be strenuously resisted. It is not only contrary to the practice of the architectural profession, it is contrary to the ordinary practice in all professions, and is a kind of proposal which can only be characterised as impudent. In addition to all this, the competition-drawings are to be made to the scale of a quarter of an inch to the foot (!), a scale larger than is ever now employed for working-drawings. "The prize-money (*sic*) to merge in the commission," is added. "Prize-money" is good.\*

WE are informed that a sale was lately effected of Mathern Palace, with the land, situated two miles south-west from Chepstow. This is the "pretty pile in Base Venteland longing to the Bishop of Llandaff," cited by Leland. Mathern was given to the See of Llandaff by it, is said, Maurice, who succeeded his father Tewdric, or Theodoric, as chief of Morgannuch (Glamorgan), *circa* A.D. 600; it ceased to form the episcopal residence after Bishop Beaw's death, 1705. The story runs that St. Tewdric abdicated in his son's favour, and became a hermit, but quitted his retreat to resist the heathen Saxon invaders, whom he defeated near Tintern. Mortally wounded, he enjoined Maurice to bury him and to erect a church on the spot where he should die. This was done, and a church was built at Mathern—Merthyr Tewdric, or the martyr Tewdric. Godwin, Bishop of Llandaff, 1601-18, found in the chancel what he believed to be the saint's stone coffin, and set up there an inscribed tablet to his memory. Meantime, Bishop John de la Zouch, consecrated 1408, had built the tower, porch, and the north and north-east portions of the palace, to which Miles Sawley, promoted to the see in 1500, added the chapel, hall, kitchen, and adjoining apartments. The buildings consisted of an outer court, of which but little is now standing, and inner yard, with a fine porch in the latter. They were suffered to fall into neglect, and two years ago were occupied as labourers' tenements, but portions yet remained of the beautiful window in the chapel, which appears in the view, by Sir Richard Hoare,

\* It may be worth while for the Committees in question to note that both the competition schemes referred to have been sent to us by architects who had presumably applied for them with the view of competing, and who were obviously disgusted, and have made no use of them but to send them to us for comment. This is a significant indication of what sort of architect competition Committees are likely to catch by conditions of this kind.

Bart., for William Cox's "History of Monmouthshire," 1801, 4to. In the church restored ten years ago, were buried many of the bishops—Jones, the first Welshman appointed to the see (1574), Blethyn (1590), Murray (1639), Sawley (1516), and Kitchin (1509), whom Godwin, in his "De Presulibus Anglie," terms the shame and reproach of the see. Bishop Marshall, builder of the former Decorated altar-screen, now at the east end of the north presbytery aisle, Llandaff, built the lofty pinnacled tower the church at Mathern. There is a monument to Colonel Hughes of Monmouth Court close by, who held Chepstow Castle in the Civil War. Moine's, or Monk's, Court had been rebuilt by Godwin; its large stone gateway, with flanking towers, is also shown after Hoare, in Cox's work; and thither took from Caerleon the two inscribed Roman monuments mentioned in Gibson's Roman supplement to Camden, the one to commemorate a restoration of Diana's temple by T. A. Postumius Varus, the other being a votive altar to the Emperor Severus, who died York A.D. 211, and his sons Caracalla and Geta.

AT Messrs. Turner's Galleries at 1 New Bond-street, is an interesting collection of modern pottery and porcelain, showing the adaptability of the material to modern uses. Among other exhibits is a wedding present from the Staffordshire Potteries to the Duke and Duchess of York. The present consists of a washing-stand, dressing-table, entirely in porcelain, with toilet and trinket sets, &c., in the same material. The modelling of these pieces is founded throughout on shell-work designs decorated with the shamrock, rose, and thistle in raised gold. The upper portion which is fitted the mirror, is so treated that electric lights are introduced behind the curls of the shell-work, and send forth rays, softened by being placed in recesses entirely out of sight, and thus tending to illumine the colours and tones of the transparent porcelain in a very agreeable manner. Enclosed by the shell-work, which acts as a frame, are placed nine pictures illustrating the "Marriage of the Roses" (York and Lancaster), and treated in a fanciful representation of the bride and bridegroom as the red and white rose respectively. Two of these pictures are placed on panels to the doors of the side cupboards which are also of porcelain and hung by brass pivots. Beside this example of a series of dinner-services, &c., on which pictures, not merely in monochrome, but with the most delicate effects of light and shade and gradations of harmonious colour. These pictures, in figure-subjects, landscapes and flowers, are printed on ware in biscuit state, and being afterwards dipped have the brilliant effects of painting in glaze, the colours being, of course, absolutely permanent. The great use of the exhibit seems to lie in showing that the best results are to be obtained from treating a material in a manner exactly suitable to its idiosyncrasies, no attempt being made to reproduce architectural details and the like. On the other hand, such a *motif* as a shell is taken and the whole design bears similarity to scrolls and forms found in the natural shell. Sufficient glaze seems to be given to ensure cleanliness without loss of texture. Among other articles specially to be noticed are electric light shades founded on shell designs the light itself being completely hidden. These are likely to be of service in preventing the inconvenient glare too often met with when this light is used.

THE case of Albert Hill & Son v. Rev. G. P. Clarke, heard at the Brecknock County Court a few days ago, deserves attention, as turning on a case of inaccurate quantities. The action was brought by plaintiffs, who are slaters, to recover payment for the value of work done over and above

\* See "Llandaff Cathedral," the Builder, May 7, 1894.



tract, to the extent of 120 yds. of and 60 yds. of eaves, owing to the quantities were inaccurate. It is that the inaccuracy was not dissimilar to much work had been done and paid for; but the defendant chose to the defence that he was bound only contract executed. Every one will with the opinion of the Judge of the County Court that this was "a unworthy and shabby defence," and one more particularly so as coming clergyman. Whether the Judge was right in saying that it was no defence of law is a matter we do not feel so. However, the Judge ruled against defendant, and refused leave to appeal; is satisfactory to read of such an attempt to avoid payment for work on a point of technicality, being d. It is not stated in the report of the who was responsible for the in quantities.

# ARCHITECTURAL ASSOCIATION: STUDY OF MODERN ARCHITECTURE.

second meeting of the present session of Association was held on the 9th inst., in the room of the Royal Institute of British 9, Conduit-street, Regent-street, Mr. Mountford (President) in the chair. names of thirty-seven gentlemen were d for election at the next meeting, and R. Morphew and H. Budden were elected of the Association.

## The Education of Workmen.

T. W. Goldsmith (Senior Hon. Sec.) read wing report of the General Committee on ution of January 19, 1894, on the Education-Workmen:—"The Association, on January referred it to its Committee to inquire of it, and in what manner, the Architect-Association can usefully exert its influence the organisation of a more thorough of education than at present exists, for engaged in the London building trades, further supervision by architects. We usefully considered this reference, and used numerous inquiries to be made. satisfied that there are many questions d with the education of artisans in the building trades which are of very con- importance to the future well-being of ure, and which are needing careful- tion. The best course seems to us to be Association to invite a conference to meet uly date to discuss these questions. We the following bodies, and have been l that they will gladly appoint representa- attend the Conference:—Architects: The nstitute of British Architects, the Archi- Association, the Art-Workers' Guild, dent London Architects. Master of the Institute of Builders, the Master Association. Workmen: The Building Federation, the Operative Bricklayers' the Amalgamated Society of Carpenters' ners, the National Association of Oper- sters, the United Operative Plumbers' ion, the Operative Stone Masons' Society, mpanies: The Carpenters' Company, the r's Company, the Bricklayers' Company. onal Bodies: The Technical Education the London School Board. Polytechnics: d Guilds' Technical Institute, Regent-olytechnic, Battersea Polytechnic, Borough hnic, Goldsmiths' Institute, New Cross, ople's Palace, Mile End. We recom- "That we be authorised to invite- ence of representative bodies to meet at date to discuss the education of artisans d in the London building trades, and to h other steps as we consider desirable in- ter.

E. W. MOUNTFORD,  
President, Architectural Association.  
F. T. GOLDSMITH,  
B. F. FLETCHER,  
Hon. Secs."

Owen Fleming formally moved the on of this report, which was seconded by n Begg, and unanimously agreed to. A. Beresford Pite then read the following n "The Study of Modern Architecture."

## The Study of Modern Architecture.

not much good mourning over the times in—that we have to deal for the most part artistic and parsimonious clients, that we

have no native art traditions or instincts to assist us in the craftsmen whom we employ, that where architectural ability exists it is no recommendation or guarantee of professional success to its possessor, and that commissions are obtained by much the same connexions as more ordinary business, the family friends or social qualities of the young architect being more certain sources of properly than ability, or even genius, in his art, or that competitions are generally an effective premium upon subservience to vulgar ideals (not using the adjective offensively). We indeed, as architects reading the glorious past of empires and nations in their architecture, might well weep aloud for the blindness and ignorance of the rest of our race, were public weeping of any avail.

And as young architects, having much of the frank discrimination of childhood still left to us, might we not lament that many, very many, perhaps the great majority, of our professional elder and younger brethren are sadly deficient in true architectural perception or power, and that the sum of all our labours is a national architecture which, in comparison only with contemporaneous work abroad, is quite unworthy of our idea of Great Britain's international position. And leaving out our elders from the purview, can we be at all happy about ourselves; is the "Architectural" element of our present "Association" worthy of its name? Does not the suggestion of a critical review of the aggregate architecture evolved by our members chill us with searchings of conscience that our self-satisfaction would be unable to survive? But all this mourning and pessimism is not very much to our present purpose. Let us at the outset assume all that it can do for us by accepting the conviction that there is much scope for improving by what means we can our modern architecture, and taking the common "A. A. man" as we find him, and the ordinary circumstances of present-day practice, let us consider what the study of latter-day architecture can do for our present discontent.

Mr. Fergusson comes to this conclusion of his "History of Modern Architecture," without unhappily helping us forward. "On reviewing the history of architecture during the past three or four centuries, the retrospect, it must be confessed, is sufficiently melancholy and discouraging. For the first time in history the most civilised nations of the world have agreed to forsake the only path that could lead to progress or perfection in the "Master Art," and been wandering after shadows that constantly elude their grasp. When we consider the extent to which building operations have been carried during that period, the amount of wealth lavished on architectural decoration, and the amount of skill and knowledge available for its direction, it is very sad to think that all should have been comparatively wasted in consequence of the system upon which these have been employed. Few will dispute the assertion that there is no Renaissance example equal as a work of art to any Gothic or Saracenic building, or that ever attained to the picturesque appropriateness of these styles. Nor has any modern design ever reached the intellectual elegance of the Greek or Roman, or the sublimity of the Egyptian; and all this simply because of the mistaken idea that success could be achieved without thought, and that the past could be reproduced in the present."

But Mr. Eastlake is more hopeful, and cheerily points out a road to an architectural paradise which, unhappily, but a few short years have sufficed to make us forget. The conclusion of his "History of the Gothic Revival" is as follows:—"Architects must learn to sacrifice something of their antiquarian tendencies: the public must learn to sacrifice something of their conventional taste. By dint of earnest study and endless experiments, by help of theory and precept, by means of comparison and criticism, the grammar of an ancient art has been mastered. Shall we ever be able to pronounce its language—not in the measured accents of a scholastic exercise, but fluently and familiarly as our mother-tongue? Will a time ever arrive when, freed from the idle prejudices, the pedantry, the false sentiment, and the vulgarisms which have hampered its utterance and confounded its phraseology, this noble and expressive language shall be used throughout the land, retaining here and there provincial idioms—rising to eloquence in our towns and majestic emphasis in our public buildings, telling of rural beauty in the village homestead, and exciting to devotion in every church, proclaiming comfort in every home and stability in every warehouse? Then, and not till then, shall we possess—if it be worth possessing—a really national architecture. Then, and not till then, will the Gothic Revival be complete."

The study of architecture hitherto has consisted

of the review of the works of antiquity, all the resources of which have been laid under contribution to our knowledge of what we have mistakenly called the "styles." Travel and research during the past hundred years have made this possible, and attracted in the first place by beauty of forms and detail, then by the interest of history and developments, architectural students have glowed with enthusiasm over Greek, Egyptian, Roman, and almost every "style" as it became available for observation. A somewhat wider range of view more recently has led to a consideration of the methods and motives of ancient design and construction, and enthusiasm has grown into wonder as the science displayed by Greeks or Goths has been discovered where little else than native genius was suspected to have been at work. The æsthetic and accidental charms of all the "styles" have not been wasted upon desert air, as sketch-books and photographs have noted and secured their effects for further publication or use. None of this enthusiastic study has really been wasted; its fuel has obtained for us a warmth and truth of imaginative colour that has been invaluable to all our conceptions of the past in art and literature; this has been especially manifest in the work of the historians with which our own generation has been so richly endowed, but as the architectural student in becoming a practising architect has been over-mastered by his love of the forms and principles of "the antiquary times," the result upon our current modern architecture has been the occasion and cause of our melancholy and discontent.

It will be a hopeless and thankless task to set before architectural students the foolishness of this enthusiasm, and the unwisdom of a thorough concentration of energy upon the mastery of the secrets of the success of ancient work. Without this kindling of interest and awakening to the artistic life of architecture we shall be worse than mere pedants and be mere measurers of buildings, tailors of construction, drudges of mechanics, and soulless men of business. Enthusiasm and a lofty ideal of beauty are all and everything to true architectural success, and at all costs the flame must be kept burning, and in speaking to students the pre-eminent need of a devouring zeal for their art must be insisted upon. If you have not yet experienced the unmistakable joy of discovering a deep pleasure and delight in the attainment of an architectural design, a pleasure that lights up all the study that otherwise might appear dry and uninteresting, that creates a living interest in fine buildings, leading cheerfully to laborious measurement and study, and to be very practical indeed, if all your spare time is not claimed by almost irresistible impulse, after other pre-eminent duties and calls to its pursuit—an old-fashioned but well-chosen word—you may well have serious misgivings as to your future in a profession which is full of most anxious responsibilities, which has an unusual proportion of disappointments and difficulties, and which is by no means remunerated in proportion to the care and study required to attain success in any single exercise of the architect's duties. It is a matter of deep conviction, that a young architect's path, except in very rare and fortuitous instances, is one that above all requires the stimulation of a genuine and spontaneous enthusiasm for his art.

Our position is therefore that the marvellous enthusiasm for varied phases of the architecture of antiquity to which this century has been witness cannot be any longer beneficial to the modern architect, and further, that without some equally potent force, as living and instinct as the ardour of the past, the modern architect, and with him modern architecture, are in a pitiable condition.

We are not altogether without sources of information as to the effect upon architectural art of different conditions than those which have operated upon ourselves. In spite of our native phlegmatic tendencies our more volatile Continental neighbours have been no competitors with us in the race for novel fashions and styles. The mysterious rabies of our Gothic enthusiasts has scarcely infected the warmer blood of the French and other nations of southern Europe, and we can discover in their architecture little or none of the frenzy of our own.

In company with Belgium, Austria, Italy and Germany, France has pursued a regular academical development of the traditional architecture of the immediate past, and with patient studiosity the "European style" of the nineteenth century has been attained. No warmth of feeling has evolved in its generation, and while claiming respect for all the qualities of appropriate and characteristic civility, certainly until the loving and progressing hands of Time with her handmaid



History intervene, no warmth of enthusiasm can be excited within us towards the Continental architecture of our own times.

We cannot stay to discuss fully now the causes of the want of freedom and adaptability, the liberty and fraternity of design, that seem the inevitable result of the academical system of complete architectural training as adopted abroad. It must be sufficient to say that mere enthusiasm for training or study and education cannot of itself supply the needed fire, and that we must not mistake professional equipment and qualification for architectural efficiency and power. There is some considerable danger of this at present among ourselves; we are all conscious of the slackening interest in old work and its study, as the failure of competitions for medals and prizes offered for measured drawings testifies, and it is to be feared that the progressing pressure of examinations is already impinging upon the tender growth of that enthusiasm which architectural educators seem strangely incapable of assisting.

Until we get a new enthusiasm, let us take care not to strangle the old one. Enthusiasm may be foolish, but she is a goose that has laid golden architectural eggs.

Our position, however, will soon become ridiculous. We are waiting for an affilatus—for some now unknown, but ardently-desired guide—some cherub or "mahatma" to hoax us into vigour and reveal the new laws of the unseen beautiful of Goethe. Where is the romancer to conjure us, as Walter Scott did our grandfathers, into the Gothic Revival, and the Houses of Parliament into existence? or the philosopher who like Ruskin, can make us like our fathers, weep with joy over the stones of Venice, and conjure the Oxford Museum and the Law Courts into being? or an architect even, like the cunning charmer who has led all his followers into the softly-fatal toils of that Circe of architecture, Queen Anne, and has left them there transmogrified into lower beings? The strings of our artistic being wait for some Æolian breeze from Parnassus to awake fresh chords and harmonies, and while we wait and sigh the examination and qualification screw is being applied, and the soft impressionable artist is being strung up into an instrument that must be struck artificially and smartly before any sound can be obtained from him—the piano-organ of the streets, in fact, being only an Æolian harp progressively strung up and tuned to qualifying pitch, assisted by applied mechanics in the production of music, so as to be independent of the gentle zephyrus of heaven.

Speculation as to the future is almost as unprofitable as lament over the past, but the suggestiveness of the idea that architectural students two centuries hence will be like ourselves enthusiasts as to the works of their own ancestors, may have something to teach us. Why not apply our own treatment of the past to our present? Why not be as enthusiastic about the work of the nineteenth as about that of the seventeenth century? Why not sketch it, study it, measure it? It may be every bit as good and as much better as Queen Victoria is than Queen Anne, or even Queen Elizabeth. All that goes for the making of good architecture has been much more abundant in our era than in the past, and perhaps if we gave up looking at distant objects with telescopes, and looked naturally at what is around us, we should find as much to interest and delight our eyes. Surely the historian will feel an enthusiasm for the nineteenth century that will be shared alike by the man of science and the artist and man of letters! Why should the architect stand aside and be unmoved? Is he not already qualified by his recent revival of the whole gamut of the styles from Egyptian down to the Batty Langley of the eighteenth century, to proceed into the nineteenth and study modern architecture with some of the enthusiasm that he has lavished upon the others at such expense of reputation to himself? There are marvels enough of construction, economical as well as extravagant, and of applied science, differing from that of Greek temple or Gothic cathedral, but definitely architectural, in the equipment of our buildings and their adaptation either for machinery, public uses, or domestic comfort. And within the limits of a century have we not erected a series of buildings the æsthetic qualities of which are varied and beautiful in a very high degree, and more so than those achieved by any other race, the wide world over, in a similar span of years? In construction, in scientific equipment, and in æsthetics, surely the architecture of the nineteenth century will be as worthy of enthusiastic admiration, we do not say imitation, as any of its predecessors that now excite our

envy! The inbred and underlying general maxim of our education, that ancient work is good and worthy of study and modern bad and unworthy, is illogical and untrue, and without attempting to invert it and prove the opposite, we may safely admit modern architecture to the students' course, and commend it to his heart, without offering the smallest slight to his ancient ideals, or destroying the value of a single result obtained from his enthusiastic devotion to the past. To study and enjoy ancient art as much as ever, will be the best advice to give, but also to study modern, and enjoy modern architecture, if only for its modernness, and to derive our enthusiasm from the wonderfulness of modern life and invention, and to display your delight in it in your architecture, by your frank acceptance of the present, by your heartiest endeavours to make the best use of the materials, inventions, and science of the time, and let your trained and instinctive sense of beauty express in proportions, composition, features, and decorations that you are not guided by a blind subservience to archaeological ideals, but rejoice in living in an age of privilege and advantage, with all the knowledge of the past ready to your hand, and the products of commerce and science at your disposal.

It was the use of advantages and qualities such as these that made all characteristic architecture in the past, and which cannot fail to do the same for us and you, and a little patience and common sense will soon reveal to us, and to the world at large, perhaps to them before to us, that an enthusiasm for modernness in architecture results in more direct and simple beauty than some of us expect.

From day to day, in ordinary practice, we are of course face to face with all the essentials of modern architecture in whatever branch and for whatever purpose we have to design; the putting aside of the uncomfortable yoke of archaeological style will be no difficulty in itself, as greater freedom for imagination will be the result, and with the resources of all beautiful buildings at our disposal for material as before, and a free hand for their artistic and eclectic use, whenever we perceive that we can use them to realise our ideal of what architecture should do for our time and age.

Nothing can be evolved out of nothing, and we are far from suggesting that the architect should lay all his present material of design aside and figuratively make bricks without straw. But all this material however does not lie, as the Royal Institute of British Architects' examination scheme in its art section syllabus seems to imply, in a knowledge of the forms and features of ancient architecture. The beauty of ancient buildings cannot be transferred by imitation to modern ones, for you may measure and photograph and reproduce in actual building, and find that you only have a stupid copy without life or interest.

As this has been a century of revivals, examination of some of its typical buildings cannot but be instructive. Try to discriminate between the beauty that is merely borrowed from antiquity and the living elements of architectural art that compose it. Ascertain how much is interesting and attractive merely because it is reminiscent to the student of bygone art, and how much is beautiful because it is expressive of the architect's delight in his problem and its elucidation, and manifests his appreciation of justice in proportion, of ornamentation, and form. Analytical study of this kind is essential to a proper grasp of the architecture of any period, though the dry-as-dust pundits of the day are not awake to it.

It is, indeed, a wonderful education in itself to behold a great building as the Parthenon, simple in all its parts and clearly readable in its plain construction, to recognise an awful grace and a fascinating dignity in its picturesque grandeur; and cherishing the fact of its unmistakable beauty seek to ascertain the anatomy of its expression. It is, indeed, not a fruitless task for a modern architect; the secret of its beauty is not only in the subtle mathematical ratios that underlay its design, not in the forms of its detail, and not only in the unrivalled dignity of its Acropolis site. Surely it is not in its antiquity, for it must have been more truly and perfectly beautiful when it was first revealed as a work of the most modern architecture of its glorious era than even now in its picturesque and suggestive but sad ruin.

Its charm is independent of archaeological descent or antique traditions, and lies in a manifested power to support and carry, to shelter and shade, and to endure with firmness. The mind without effort is assured that the first necessities of all building are satisfied. The simplicity of the expression of these great facts is its first claim upon

the mind, just as is the sense of the immovable, so far as time is concerned, eternal scale and vastness in the case of the Great Pyramids. But this serene majesty of conscious power secured and expressed with every evident perfect finish and completeness; the same strength of support might have been barbaric and strong, the sense of shelter might have amounted to gloom, and the sense of firmness and firm might have been inelastic and dead; but nothing has been accomplished with art as with power; the columns are perfectly shaped, their load, and are decorated to emphasise the direction of their expression; they are shaped completely to satisfy the eye as to stability, and abaci crown them only to receive their load. Their bulk is regulated by the superincumbent load, weighed with regard to the possibility of connecting beam, and adjusted to satisfy the eye as to the due proportion of void and solid. The ample entablature is the essential element of the design, affording shelter and binding simple horizontal masses and lines the supporting columns into covered and shady colonnades in carrying the roof creates the building. Entablature is emphasised and decorated, rests, with sufficient beautiful forms of metopes, the undecorated triglyphs with vertical flutings sufficing to convey the expression of the downward bearing of the roof upon columns. The cella walls are equally expressive of the required enclosure, without unnecessary architecture, yet magnificently decorated with unbroken line of frieze, still remaining in the western walls. The simplest lines and the direct expression govern the whole, permeating in the decoration the required element of rest and play of line to afford balance and contrast to the eye.

Every one of these elements and methods be transmitted into modern architecture, as the architectural materials of the design are handled and disposed by the skill and judgment of the architect rather than by mere reiterated forms and details. It is however singular that you may have a reproduction only of the forms and details but of the proportions and size of the original, and a mysterious and complete beauty. The Western Ratisbon, built by Klenze as a temple of fame, is a complete archaeological reproduction of the Parthenon. The building pierces a fine site on the slope of the hill border the Danube that would lend itself really fine building if suitably designed. Expense has been spared upon it or its scale but apart from the inevitable differences of material and site, the whole is uninteresting; except failure, and miserably unimpressive as a structure. Looking upon the Parthenon, some later it is true, not a thought or recollection of the vaulted Walhalla crossed my mind, and it is not a fact that the latter is an expression of the other, even as to size, it would connect the modern commonplace with real original in any way. It must be some more than even ignorance of the curvature of horizontal lines that makes the difference. Klenze could do very satisfactory modernism himself when less trammelled with archaisms as witness the new Pinakothek at Munich, is a really fine and simple Classic building, admirably adapted for and expressive of its purpose as a picture-gallery, and distinctively modern and reasonable.

The application of an analytical examination of a modern building of the revived Greek style will be equally valuable to the student. As an archaeologist the interest and charm of reviving pure Greek mouldings features and proportions; but having admitted so much, to strip the modern edifice of all this adventitious architectural quality, and see then what permanent and modern architectural value remains. This does not mean that you are to regard a building as a carcass without the form details requisite to its beauty, but as having of them on account of their express suitability and appropriateness to the purpose in hand merely as necessary adjuncts to the main because it is pseudo-Greek in style, as demanded by antiquarian rather than architectural instinct. But this analysis of the archæological motive in design ought to go deeper still in principles that regulate a use of features should decline to admit the use of the ornament decoratively, apart from the intention of the natural constructive elements of building. A concrete case, in such a work as the Pancras Church in the Euston-road, which, know, will illustrate the process and enable ascertain how much of it is ancient and how



architecture, and how far the ancient  
as of design have been preserved in the  
its elements.

A particular example is the more interesting  
erected by Inwood, who, after its com-  
designed the neighbouring church of St.  
in Seymour-street, Somers Town, in the  
"taste." In the design of the latter  
archaeological zeal and accuracy play no  
exercise no charm, as Inwood was in  
as to the new light that was about to  
in the lamps of Mediæval art, and having  
barest acquaintance with its forms and  
he had to fall back upon his perception of  
ary and common properties of all archi-

This work, therefore, unfortunately  
to be lacking in any pleasing quality  
its proportions being ugly, and  
ole thoroughly uninteresting inter-  
d externally, in arrangement and im-  
and the greatest charity could only  
s removal or its "restoration" as  
g an instance of the real poverty and  
ss of the field of modern architecture  
the nineteenth century, apart from an  
fertiliser compounded of the dry bones  
ct ages. St. Pancras is on the other  
building that suggests in every form and  
thustastic archaeological study. I well  
r being taken to the church as an  
icated child, and wondering why the  
the windows instead of being upright  
towards each other at the top, and  
outwards below; and my somewhat later  
in a picture-book of Egyptian doorways  
the same, and the appreciation that  
f the architect's motive, which I may  
posed had been to make a church as  
possible harmonise with the pictures in  
ture history-books of the period. Another  
ression, however, was of the very solemn  
l effect of the row of heathen goddesses  
t watch on either side of the church over  
tea-caddies outside the vestries. Paren-  
too, of the curious ecclesiastical position  
acher, standing within a wondrous pulpit,  
of the Royal Oak in which King  
II. had been ensconced, though not for  
ose of preaching. The antiquarian  
ness of the design is in its way most  
le, and is perhaps of a sounder type  
t of Klenze's Walhalla. Its proto-  
ountain is in the Temple of Minerva  
which forms part of the Erechtheum on  
opolis at Athens, the lovely eastern  
f which supplied the order for St.  
but how different the result can scarcely  
ed! The original seems to be a very  
to the Graces of architecture; a refined  
ate elegance of proportion, a sense of  
its true meaning, of virile beauty and  
er characterises it, which loses nothing  
tion upon the platform of the Parthenon,  
matematical comparison with which it  
is minutely in scale, though in interest  
arm holding its own completely. The  
St. Pancras is just double the size of  
the Temple of Minerva Polias, and though  
st care has been bestowed upon the  
the order, the real appreciation of the  
ace of the original being lacking, its  
is not been grasped. There is (sadly  
or our consciences, if profitably for our  
purpose) one of the columns from the  
trico of the Erechtheum in the British  
and, even as a limb torn apart from its  
a wonderfully-beautiful object, which each  
ould take an opportunity of examining,  
ay on your way to the "Artists'" shoot-  
hind St. Pancras Church of comparing  
with that of one of its overgrown  
o. The portico and order of St. Pancras  
fall for other reasons than want of  
proportion. There is no simple and  
ceived motive prompting its existence.  
The hard and unpleasant truth will out,  
but a sort of antipathy to the steeple  
on, with which it is connected by an  
th acts as pseudo-peribolus to the octagon  
bove, and which disconnects the roof of  
a most effectively from the pediment of  
o.

design of the steeple may roughly be  
as two choragic monuments placed upon  
r, surmounted by a tower of the winds  
ed by a large acroterium and a Latin  
th the exception of this last item all the  
Athenian, though the composition is  
from Sir Christopher Wren. Setting  
quarian considerations, the interest  
though the subtle conceit of applying a  
monument for the accommodation and

celebration of campanological music, and a tower  
of the winds as the site for a weathercock, might  
be cherished as sufficiently sentimental to be  
respected, though by the way the appropriateness  
that might have been gained by affixing the clock  
face to the horologium or tower of the winds has  
not been taken advantage of, the clock having  
been wisely brought lower down the steeple into  
view.

Apart from being nakedly uninteresting, the  
proportions of the composition of the western  
front are satisfactory, and will preserve for the  
building and its architect more esteem than the  
effort to be Greek. The eastern end of the church  
is necessarily more original and consequently  
satisfactory, the apse and transept-like vestries  
having some scale, grouping, and expression of  
their own. The infatuated architect—is the  
description too strong?—however, with infinite  
pains and much expense has conceived and  
executed the wonderful Caryatid adjuncts, with  
Cecropæan sarcophagi, one supposes for the  
purpose of typifying that, modern Acts of Parlia-  
ment to the contrary, the enclosure around the  
new St. Pancras Church was meant to be a grave-  
yard. All this we admit to be sheer excess of  
antiquarian zeal, wasted upon architecture, and  
unworthy of the good sense of our time. Not  
that architectural poetic effort is senseless, but that  
the reproduction of antiquarian beauties for this  
purpose is not architecture at all. The wondrous  
beauty of the single caryatid peristyle of the  
Erechtheum however can only be travestied and  
wasted in London. Its effect and freshness  
belong to the living and permanent efforts of  
architecture. The south elevation of the  
Erechtheum, which looks upon the north side of  
the Parthenon, presents no other features than  
these majestic sisters, sculptured in dignified awe  
of the building they front. With masterly  
consideration and self-respect the architect  
presents no peristyle or portico to flank the  
Parthenon, though every other front of his  
building is so treated; the strikingly original and  
unique composition that he designed preserved  
the dignity of the Erechtheum in according its  
homage to the Parthenon. Of the figures we do  
not dare to speak. They are, perhaps, the most  
striking combination of the finest architecture and  
supremest sculpture that the world possesses.  
They cannot be claimed separately by either art;  
they are at once architecture and sculpture,  
differing in their essential combination from the  
partnership of service that each of the sister arts  
agreed to render in perfecting the Parthenon.  
Sir Frederic Leighton has paid an eloquent and  
discriminating tribute to the sculpture of the  
Caryatides in one of his addresses, remarking on  
the subtle variations of line in the different  
figures. Five of the six sisters are *in situ*, the  
sixth is in the British Museum, miserably divorced  
from domestic happiness in a chilly and unhappy  
exile, losing instead of gaining by her solitariness.  
A reproduction cast in cement most ineffectively  
takes her place on the Acropolis, and as a good  
cast would be satisfactory enough for purposes of  
study at home, it does seem desirable that the  
integrity of the Cecropium of the Erechtheum  
should be by an act of our Government, satis-  
factorily restored by the replacing of the original  
where it will be of immense value to the  
wonderful building of which it is an integral part.  
I am indebted for this suggestion to a conversa-  
tion with Mr. Arthur Cates, whose friendship  
with Dr. Schliemann and knowledge of Athens  
qualify him to speak, and as questions which  
would arise and difficulties which would lie in  
the path of the return of the Elgin marbles to the  
Acropolis would not arise in this case, and as the  
result must give much gratification to the whole  
world of art and letters, it is to be hoped that  
steps may be taken to give effect to the suggested  
restoration of this exiled Caryatid figure.

The present Prime Minister, being a member  
of the Society of Dilettanti, we can certainly  
invite the Institute of Architects, with their "great  
Athenian" President, to seize their opportunity.

The Caryatides of St. Pancras are of clay  
and iron mixed. The interior of the church  
however being less trammelled is more satis-  
factory, and indeed its large and spacious  
effect of a fine hall with an impressive  
apse is to be preferred as more suitably  
modern than many Gothic interiors, having  
dividing arcades and walls with narrow and  
unscientific ceilings and roofs.

There are lessons enough for an observant  
student as to the permanent and effective  
qualities of modern architecture, even after  
skimming off all that the architect himself would  
have called the architecture, of such a building as  
St. Pancras Church. What is true of works of

the Greek revival is equally so of the Gothic,  
though the degree of interest may vary, and as  
the sources lie ready to the hand of the architect,  
as well as to the eye of the world at large, it is  
more difficult perhaps to separate the elements of  
design. But the test may well be applied in the  
crudest way to the most recent and perfect  
examples of modern ecclesiastical architecture.  
Deprive a modern thorough Perpendicular church  
of its archaeological robe, and of its studied  
interest in correctness of style and purity of period,  
and what is there left to indicate that the world  
has moved on since its primal age of Mediæval  
beauty and innocence, and that we are in the age  
of England's greatest prosperity and glory?  
What is left indeed to indicate any life or move-  
ment, or that it was built in the nineteenth instead  
of in the fifteenth century, except, perhaps, the  
existence in the building of a heating apparatus, a  
gas supply, and some limited sanitary arrange-  
ments? Consume the archaeological and artistic  
skill are required to accomplish such a result as  
against natural tendencies and laws; in our  
time such efforts have fairly maintained the un-  
reasonable conflict with modern progress, but to  
no good effect, for when the disintegrating  
intellect of time pronounces verdict upon such  
works, it will be without recollection of the fiery  
enthusiasm for Mediæval antiquity that produced  
and governed them, and they as buildings of  
modern times will be judged by the cooler light  
of the nineteenth century.

There are a large number of buildings, however,  
of the Gothic Revival that have qualities well  
calculated to survive the ebbing of the tide of  
Mediævalism, buildings the interest and charm of  
which rest upon surer artistic grounds that are  
common to all the ages.

We are gradually drifting away from the tide  
from the sympathetic feeling which prescribed  
a peculiarly national style, such as Elizabethan or  
Perpendicular for the Houses of Parliament,  
while Pugin's accuracy of feeling for Gothic detail  
is perhaps somewhat palling upon our jaded and  
corrupted palates. But there remains in the  
group of buildings by the river side at West-  
minster a beauty that is more lasting than a  
passing taste, and reveals the fact that the greater  
architectural qualities of majestic symmetry and  
grandeur of grouping are permanent and essential  
to success. A celebrated Munich artist, Mr.  
Rosenthal, who had rather derided English archi-  
tects as "Gothic eaters," said to me that, of  
all the buildings he had seen in England this  
was the most lovely, and he was in little doubt  
as to its being the most charming group in Europe.  
The effect from the river or from either Embank-  
ment is one of graceful ease and restful pic-  
turesqueness, illustrating the overlooked truth  
that a proper appreciation of symmetry in archi-  
tecture produces picturesqueness in a natural and  
unforced manner, that is much more satisfactory  
than the artificial grouping that only looks well  
from a fixed point. The interest of the whole  
building is sustained by its parts in spite of its  
detail. The variety of design in the general  
forms of the towers and pavilions is pleasing,  
though the forms themselves are doubtless open  
to proper criticism from trained Mediævalists, and  
this variety is wisely used in a building of so  
regular a plan. The Mediævalism, indeed, is  
only skin-deep, the corpus of the whole being of  
sound architecture, so that our friendly and useful  
fogs and river mists, by assisting in the oblitera-  
tion of its archaeological epidermis, we are  
enabled to admire in it a fine work of modern  
architecture.

The Law Courts will come rather differently  
out of the test, as the marvellous Gothic life  
which invests its every detail and feature may  
be chiselled away and the building will still be  
rampantly Gothic. Re-clothed it with Classic or  
Renaissance detail, and the vigour will still be  
powerful enough to assert its vitality and claim  
the building, so long as it has any articulation left,  
as the *ne plus ultra* of the Gothic revival. The  
design flings aside almost contemptuously the  
common properties of the modern architect,  
and claims to be independent of symmetry or  
repetition, no mere grandeur being aimed at, and  
repose being despised. Relying apparently on  
the mistaken supposition that a complete Gothic  
building must be as broken up in outline  
as one that is a growth of generations, upon  
originality in the design of features and detail  
alone success is sought. The wonder is that the  
building is even as successful, as we must confess  
that it is, in arousing wonder for the extra-  
ordinary capacity of the designer, who almost  
superhumanly set aside all laws of composition  
and balance, and fought against the very elements  
that would have assisted him to an easier success.



The building as a whole gives little or no pleasure to anyone who cannot appreciate its motive power of Procrustean Medievalism, which insisted upon forcing everything into its ideal mould.

Pull it down; break up its arcades and columns, its pinnacles and staircases, and scatter it far and wide; for there is enough of it to give a large store of masonry to the museums of every civilised nation of the globe, and you will doubtless find that the fragments of archivolts, and strings, and plinths, of corbels, caps, and bases, of all the multitudinous variety of interesting detail, will then begin to arouse genuine enthusiasm for their wonderful beauty, originality, and vigour, and that the fame of the designer will become a world-wide reputation as a master indeed of all the arts of design. But—and it is a significant "but"—who of us would have much doubt whether the most ingenious future restorer of Medieval or prehistoric antiquities would ever be able, even with all the fragments before him, to reconstruct a reasonable and rational pile of nineteenth-century architecture out of them?

We have buildings enough, however, of a much more typical class, and likely to be more useful to us in our own careers, in which the really modern elements of fine architecture stand clearly out. Do not fear to be modern, study and sketch every example that faces a modern requirement and subduces it artistically, and renders it beautiful without sacrificing aught upon the shrine of antiquity. A warehouse front, even if stipulated to be wholly of windows with only iron-girder construction besides and a few brick panels, can and should be made as beautiful and interesting a work as a half-timbered front, of which there are many examples, with continuous and unbroken ranges of windows. And have we not for such classes of buildings resources in new materials, that sensibly used would soon be recognised as artistic, such as glazed brickwork and terra-cotta? only when not used and designed as stonework. Why should concrete and cement building be left to the tender mercies of cheap speculative builders? when we have plenty of need to be taught the value of broad unbroken surfaces in design, and long for economical methods for smaller country buildings, where the use of different textures in the finishings of a cemented or concrete wall will give plenty of variety and scope in new directions.

Above all, learn to discriminate, practise upon yourself, examine and try to note down the impressions made upon you by a building, say, of known beauty, and then of one that you see for the first time. Why do you like one? Why are you doubtful about another? Not what features please you merely, but what qualities create the pleasant impression. Train yourself to like and dislike reasonably on good grounds, instead of unreasonably like the amateurish and ignorant world.

"The reason why I cannot tell, But I do not like thee, Dr. Fell,"

may be an excuse for any amount of ignorance in anyone whose business and profession it is not to discriminate between good and evil in design, and who bends the whole of his efforts to marshal all the factors of each building of his hand into harmonious and therefore reasonable beauty.

Mr. W. D. Caröe, in proposing a cordial vote of thanks to Mr. Pite for his interesting paper, remarked that though Mr. Pite had dealt with the matter in an exceedingly lucid manner, and his paper was full of suggestiveness, yet he felt it impossible to attempt, at a moment's notice, to add to what had been said. There was just one point to which he would like to refer. Mr. Pite had recommended them to study modern architecture, in which recommendation he most heartily concurred, and had at the same time told them about the spirit of the Parthenon, and a more interesting analysis of that building he (the speaker) had never listened to. But in showing them the spirit of the Parthenon, surely he meant that they could not study modern architecture without some deep knowledge of the past, which would enable them to discriminate between the good and the bad of the present. When one studied modern architecture, was it to be a row of villas in Pentonville, or some of the charming buildings not far from there which Mr. Pite had set up for their study? Mr. Pite himself and his admirable lecture were the best proof that they must not neglect the study of the past. The more one knew about the dead languages, the more interest there was in the living ones, and it was precisely the same with architecture. Everything had been of continuous growth, and to be able to appreciate the beauties

of modern buildings, it was absolutely essential to have gone through a long course of study of the beauties of the past.

Mr. C. H. Brodie seconded the vote of thanks, and said he was very pleased to see Mr. Pite there that evening as one of their vice-presidents. Mr. Pite had given them some food for thought, and one of the thoughts that had struck him was, must there not be a limit to the power of the architect? Was a man fit and able to design a great cathedral or the Houses of Parliament and also to design an ordinary modern residence? If they looked at the work of those whom Mr. Pite would admit to be their best men, did they not find that the best work had been done by those who had somewhat restricted their production? That seemed to him to be the whole difficulty in studying modern architecture, because those of them who got any work to do were only too happy to get it. They were obliged to do it; they could not afford to throw it up; and, in the somewhat limited time given them it was very difficult to carry out the perfect thing which those who lived in Athens many centuries ago could turn out. The thing was not possible, and he did not quite see how the same canon of taste could be maintained. For instance, taking the simple question of weights in regard to bearings, the conditions had totally changed. The Parthenon was a beautiful building, but he did not see how it could be possible to apply the same reasoning to the design of a shop-front that they would apply to the Parthenon. The two things were not analogous in any sense; they could not be criticised from anything like the same point of view, and the difficulties which Mr. Caröe had hinted at also existed when they told a young fellow to study modern architecture. Who was to tell him what he should study, because, if left to himself, he would probably study some eccentric abortion, just because it was eccentric. The young man would not be likely to take a calm, quiet, and subdued building. So far, he was rather at variance with Mr. Pite. He considered that the foundation for the study of modern architecture must be a very complete and systematic study of old work, so that one might grow from that to appreciate other things. There was another thing which was against modern architecture. Men were apt to inflict buildings on the world, and on their clients, at too early an age. He did not know whether that was quite the right thing to say there, but he really thought that men were inclined to play tricks simply from want of sufficient knowledge.

Mr. Alfred Hart said he was unable to agree that they were not under the same canons of taste in criticising a shop-front as in criticising the Parthenon, for the same canons were applicable to each. The supports being made to appear stable, there was nothing to prevent a shop-front being both artistic and correct. He agreed with the former speaker, who had said that Mr. Pite's paper rather led them after all to the belief that the study of old work was not to be neglected. Mr. Pite had called attention to many things which, though modern, were not admirable, and had told them rather to avoid such than to copy them, having especially noted the case of St. Pancras Church. He was a great advocate himself of the study of old work, as he supposed most of them were, and he had had the opportunity of considerable study abroad. He had always found the great difficulty in approaching a building was to know what to admire and look at first. One was rather liable to be overwhelmed with the great mass of detail on it, and he appreciated Mr. Pite's remarks when he said that if the ornament could be obscured on certain buildings they would be able to appreciate them better. His mode was to endeavour, first, to grasp the general mass and outlines, and if these were satisfactory it spoke much for the building; after which he could criticise the detail. After all, it was no use lavishing beautiful detail on a bad form. As far as his experience went, he considered the securing of good form was the chief thing, and in that sense there were many modern buildings which would prove very useful to them in their studies. He would like to add his tribute of thanks to Mr. Pite for his most excellent paper.

Mr. Owen Fleming said he was a little confused as to where the difference between the ancient and the modern work came in, and would like to know where the dividing-line was to be set. He had listened carefully to Mr. Pite's interesting paper, and from what he could understand the author did not wish to draw any line at all. He had given them a survey of the works of the past, and those which were now being done, and had said that they ought not

to draw any line, but to take the best of the past and the best of the present and study all. The only reason why Mr. Pite had emphasised the study of the present was that the materials and requirements were such that they themselves would have to use. He (the speaker) believed they would get much building if they did not attempt to do much. They did not often get effect of deliberate designing by putting ornamented fidgety nonsense here and there; what he wanted to do was to have a certain idea of the building would come out well.

Mr. Arthur Bolton thought there must be good many besides himself to whom Mr. Pite's remarks on the Law Courts must have seemed exceedingly unfair, because there was a goodly might be said for the Strand front. It had been and was well known that there was possibility of the Strand being widened, that it was not a position which called for one front; as it was, to any one coming up or down the Strand, the front unfolded itself in a series of most picturesque groups, with sufficient contrast running through them, without their being designed in the more regular manner of the garden-front on the west where open space existed. What Mr. Pite had said about detail being broken up and put into many pieces was amusing, but nothing to the point. It seemed to him (the speaker) that in the old days there were two classes of building, those depended upon their detail and those that succeeded in spite of it. There were admirable buildings which had the most complete detail, such as the Giralda at Seville, its detail of stone bells, cannon balls, and vases, and yet it was one of the most beautiful buildings to be found anywhere. He thought that arose from the fact that the essence of architecture was form, the particular detail depended upon the character and feeling of the building and whether they were archaeological or not, and whether they were to do with it. Sir Gilbert Scott told them that they should never decorate forms unwisely in order to make them beautiful, and in his work, he did not always conform to this rule. He did not see that the detail of Parliament would be better with the away; it was sufficient that it did not offend the form. Some people quoted Mr. Pite's churches as archaeological, but no one would mistake them for Medieval work, and it was to him that if Mr. Pearson liked to use the Middle Ages it only showed that the Medieval architect agreed as to the details the form required.

Mr. Banister F. Fletcher said that many of the remains which had come down to them from olden times were very beautiful as the Acropolis at Athens and other cases, but what was to happen in another 50 years? If the Houses of Parliament existed then, he supposed they might be considered quite as good as the Parthenon. There were many modern buildings which were beautiful in every way, as expressive of nineteenth-century architecture, such as the Opera House at Paris and the Houses of Parliament in London. Then came the question of engineering in architecture, which he should like to refer to Mr. Pite's view about. It seemed to him the divorce of engineering and architecture had been a sad loss, especially to the architect who was not so in the Middle Ages, when the architect who was an engineer was also an architect, and the result of the growth of the Gothic structure, which, it seemed to him, was based simply on constructive principles. Mr. Pite referred to the Institute examinations, and could never see any mistake in a young man trying to put himself through a course of study. Mr. Pite did not wish them to forget the past, although some people might think they could not be expected to throw their knowledge of the past as well as that of the day. A remark had been made as to age being a barrier to good work, but he considered young men were often the people who did the best work, as in the case of the architect of St. George's Hall at Liverpool. In fact, he generally considered that if a man was to do anything he could do it by the time about thirty years of age.

The President remarked that Mr. Pite had given them many different subjects for thought, and not in all cases what they expected. The title of the paper was "Study of Modern Architecture," but it was a great deal more about ancient



modern architecture in it. He agreed with much at Mr. Pite had said, and had expressed similar sentiments a fortnight ago. His own feeling is that the students of the present day had a much easier time than those of twenty years ago, cause in past days there was a constant battle the styles going on. One body of architects at a time thought there had been nothing good in the thirteenth and fourteenth centuries, and another went back a thousand years, and between those two classes there was a constant war going on. They had, however, at over that now, and could appreciate good work wherever it was to be seen. But, as he had said a fortnight ago, the young men could do better than study the absolutely modern buildings which were growing up around them, and combining that with the study of the old work, they would be more likely to produce work which was characteristic of the nineteenth century. That was wanted was something characteristic of nineteenth-century life and requirements, and they did not want people in the year 3000 to look back and be unable to determine whether buildings were erected in the nineteenth, the eighteenth, or the first century. There were a good many things Mr. Pite had said, referring to modern buildings, with which he agreed, and some with which he did not agree. Like Mr. Bolton, he thought Mr. Pite was, perhaps, a little hard on the Law Courts; at the same time, he was quite in order in having his own views on the matter. The one defect artistically in the design of the Law Courts, he took it, was that there had been made use of certain features, simply because they were Gothic, and not because they were of any practical use in the building. For instance, the pepper-box turrets, he supposed, were of no use inside, and he did not consider them externally beautiful. These were put in, no doubt, because they belonged correctly to the style of Gothic after which the building was designed, but having no meaning they were a mistake, and their removal would be an advantage to the building. At the same time, he should be remembered that Street was helpfully hampered when doing the work. He did Mr. Ayrton as First Commissioner, a thing ought in itself to drive any ordinary man out of his senses, and he had also to struggle with a restricted area, which made his corridors dark, and for which he was not to be blamed. Had Mr. Ayrton, or whoever was responsible at the time, allowed Street to occupy the whole area now being turned into a garden at the west end, it would have given him a far better chance. Mr. Pite had referred to photography as a method of study, but he considered photography in that sense was a failure. Photographs were very useful for reference, but there was no doubt that one would learn more from making fairly good sketches of one building than from photographing 500 others. He agreed with Mr. Pite that they could not do more than sketch modern buildings; and as for doing out what was good or bad, if they did not know themselves there were plenty of people they could apply to, and if their opinions varied little it would be all the better for the student. There were many points about modern buildings which had never been properly thought out. Mr. Bolton had referred, for instance, to the fact that they might design a shop-front without using iron columns. No doubt Mr. Bolton would like as they would all like—to put in solid iron piers, but the mischief of the thing was that people would not have them. If they wished to build a shop in Regent-street or Bond-street, and proposed to put in good Portland stone piers, sufficient to carry the building, the occupiers would laugh at them, and say that a shop without a big window would be no use to them. The point was that they ought to be able to design those iron columns so that they did look well. He took it that if the architect of the Parthenon had had to design that building with iron columns, he would have made it look all right. It would not have looked as it did now, but it would have been treated in a proper way, and a beautiful effect would have been obtained. If that were the case he did not see why the architects of the present day could not do it.

He would like to announce before sitting down that the lectures on Geology would be postponed until after Christmas, and that the lectures on Heating and Ventilation by Mr. Arrow would also be adjourned, that gentleman being very busy at present.

The vote of thanks, on being put to the meeting, was carried by acclamation.

Mr. Pite, in replying, said it was a matter for

congratulation that they had had something like an old-time discussion, members of the Association having taken the opportunity of speaking somewhat freely. He must confess that he had a little liking for "drawing a red herring" in writing the paper, with the idea that some discussion might arise on the Law Courts. He thought, however, when they read his paper, they would find that he had not expressed any opinion about the Law Courts, except describing them as rampantly Gothic. With regard to the study of old work, he certainly considered it absolutely necessary, and he had drawn attention to that in more than one paragraph of his paper; but he had also drawn attention to this fact—that the study of old work, or old work as studied at present, had resulted in baneful architecture. He had endeavoured to lay examples before them, one after the other, such as the Walhalla, St. Pancras Church, the Houses of Parliament, and the Law Courts, and tried to show that what had been gleaned from the study of old work had not been of a paramount and essential character in architectural value and results. With regard to shop-fronts, he would advise them to let the four-inch columns alone, and not to put a single stitch of ornament on them; they should let the thing stand like a pencil on end, and it would look well. A man for whose opinion he had the greatest respect—Mr. Lethaby—was walking down Foubert's-place with him on one occasion and said, "I like to see these shops standing on penholders." There was a most interesting butcher's shop there, with the elements of Parthenon architecture in it—the iron columns doing their work and expressing their purpose—no humbug of design, the penholders looking as if they supported the whole house, which they did. As soon as they got the idea into their head that they had to make the iron column beautiful it would beat them. Mr. Fletcher had asked what nineteenth-century buildings one could put in the same category as the Parthenon, and had referred to the Paris Opera House, and the Houses of Parliament in London. It was his (the speaker's) idea that both those buildings would be pulled down as being abortions before such a category would be formed. The buildings of this age, which would be compared to such of past days, would be the Forth Bridge, perhaps the front of King's Cross Station, and perhaps the big Midland Station, though not its front. He did not want to traverse the ground he took last year on the subject of the architecture of the Metropolitan Railways. He also wanted to avoid having a thorough go in for the examination humbug—the sort of idea that they could get a knowledge of a building by counting its columns, and that if they turned their brains into a dictionary they would be able to say that they were enjoying the study of Greek architecture. He wanted if possible to direct their attention to what the real study of an architect involved and the direction which that study ought to take, in order that they might have decent modern architecture. He was not at all depressed about the shop-fronts. The Parthenon principles were more applicable to shop-fronts than to many other things. There they had entablature and supports, and direct trabeated construction. As to the formation of judgment, seen for the first time, it was well not to be in a hurry. They should wait until they had made a decent sketch-plan of a building, and could go home and look at it. They would thus be able to know what the architect had to do, and they could go back to the building and see how he had done it, which would enable them to form a just appreciation of its other merits. With regard to Mr. Pearson's work, with the exception of the church in Bessborough Gardens, none of his modern churches were exact archaeological reproductions, and he never repeated himself. The last thing Mr. Pearson did was always a shade further in the right direction than the thing which preceded it, and that was about the safest rule for any architect to follow. The line between ancient and modern architecture which he (Mr. Pite) had drawn that evening, was the time at which traditional architecture ceased, and the archaeological revival of Greek commenced, about the beginning of this century.

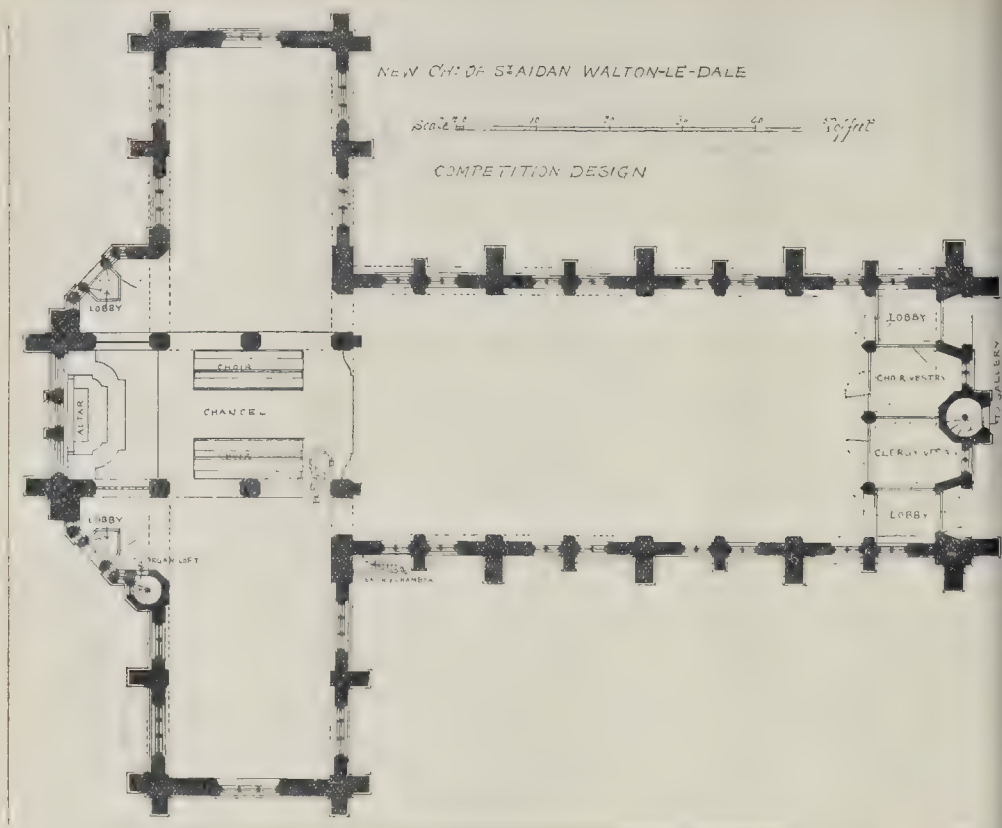
The proceedings then terminated.

#### COMPETITIONS.

KILKENNY TOWN HALL.—We are informed that in the recent competition for a new Town Hall for Kilkenny the design of Mr. J. Kelly Freeman, architect, of Dublin, has been selected.

#### THE INSTITUTION OF CIVIL ENGINEERS.

THE members of the Institution of Civil Engineers re-assembled on the 13th inst. for the Session 1894-95, in the old meeting-room, which has been retained for use while the library and offices are being rebuilt. In his presidential address, Sir Robert Rawlinson, K.C.B., referred at the outset to the works of those who might be regarded as the fathers of British Engineering, and notably to Sir Hugh Myddleton (1555-1631), who brought water by the New River from Chadwell for the supply of a portion of London; to James Brindley (1716-1792), the engineer of the Bridgewater Canal, and of many other navigations; to John Smeaton (1724-1792), whose lighthouse on the Eddystone Reef in Plymouth harbour had in recent years been taken down, owing to the wear and weakness of the partially-disintegrated rock upon which it was built, since replaced by the present structure, the design of Sir Jas. N. Douglass; to James Watt (1736-1819), for his improved steam-engine, which George Stephenson (1781-1848) had demonstrated to be applicable to locomotive purposes; to John Rennie (1761-1821), celebrated for his fen drainages, docks, harbours, and bridges over the Thames; followed by Thomas Telford (1757-1834), the first President of the Institution, whose roads, bridges, water-works, docks, and harbours had won for him universal renown. In few branches of Civil Engineering, however, had there been greater progress during the last half-century than in that which was concerned with the health and personal well-being of mankind. Sir Robert Rawlinson stated that he had been engaged during upwards of forty years upon enquiries into the sanitary condition of the cities, towns, and villages of England, and upon works of sewerage and draining. It might reasonably be said that Sanitary Engineering was not a science—it dealt neither with medicine nor with surgery; but its results were based on main-sewering, house-drainage, water-supply and scavenging, and upon the establishment of public baths, wash-houses, and disinfecting apparatus for promoting personal and domestic cleanliness. But while good sanitary works tended to promote comfort, to prevent sickness, and to prolong life, there were other powerful influences at work in the same direction—as, for example, education, increase of temperance, better wages to artisan labourers, cheaper food and clothing, and a wider-spread sympathy of class with class. In newly-developed countries sanitary engineering should aim at a general improvement of the uninhabited portions, such as forest-clearing and land-draining, the formation of roads, bridge-building, river improvements, and a judicious selection of sites for towns, villages, and houses. As the first engineer ever sent to improve the sanitary condition of an army in the field, Sir Robert Rawlinson stated that when the Crimean Army Sanitary Commission, consisting of two medical men and himself, landed at Constantinople in March, 1855, out of 32,000 troops 11,000 had died in the previous three months. By the end of the year the English hospitals were almost empty, and the British army in the field before Sebastopol was in better health than it had ever been at home. This had been brought about by larger hospital accommodation and lime-washing, scavenging, more ample ventilation of the Turkish hospitals, and better supplies of water. As British soldiers were costly, it ought to be self-evident that barracks and hospitals which would preserve the men in health should be provided, as had now been done. The death-rate in the convict establishment at Portland was only 3½ per 1,000, when the average among the police was 7 per 1,000, and in the British army 10 per 1,000. Dealing with the present and the future water-supply to the ever-increasing millions who live and work in London, the President expressed the belief that the configuration and geological conditions of the Thames basin tended to render its water singularly pure for so large a river, and that of the River Lee was equally free from objection. The waters of the Thames and of the Lee might be termed "living waters," as they were in unceasing motion. The questions were—should these sources be maintained; must the interests of the water companies be bought; should there be purchase and consolidation of management, and if so, should it be under the London County Council or by a special Water Trust? In conclusion, the President remarked that almost fifty years ago one of his predecessors, Sir John Rennie, on a similar



occasion to the present, had reviewed exhaustively the history of engineering up to that time. An epitome of the works and inventions of civil engineers during the last half-century would form a worthy sequel to that address. They had spread a network of railways over the British Empire and its Colonies; they had maintained an unrivalled position in ship-building and in the construction of machinery, and, with the aid of electricity, by bringing continents into closer communication, they had diminished the circumference of the world. A cordial vote of thanks having been passed to the President, he proceeded to present to the various recipients the medals, premiums, and prizes awarded at the close of the last session.

### Illustrations.

#### ENTRANCE TO HALL, INSTITUTE OF CHARTERED ACCOUNTANTS.

**T**HE large drawing giving the view of the exterior of this building formed one of the central exhibits in the Architectural Room at the Royal Academy this year. The plans, sections, and elevations of the building, with a description, were published in the *Builder* of January 12, 1889, so that it is unnecessary to recapitulate here the information previously given. The drawing gives an effective view of the exterior grouping of a building in which, in the words of the architect, Mr. J. Belcher, "it has been sought to avoid the sameness of the usual Classical elevation by some novelty of treatment and variety of detail."

#### COMPETITION DESIGN FOR CHURCH OF ST. AIDAN, WALTON-LE-DALE.

THIS is a design sent in competition for a proposed new church at Walton-le-Dale, the

\* We have also published the following other illustrations of this building:—Part of the competition design, under date August 27, 1888; the Hall under date January 7, 1889; and part of the friends, &c., towards Great Swan Alley, under date July 22, 1893.

drawings of which were exhibited in the Architectural Room at the Royal Academy.

The conditions were that the church should accommodate 400, with a provision for adding an extra 400 later on. The transepts were thrown out to take the extra seating—200 in each. For economy, the vestries were placed in the body of the church at the west end, the space over forming a gallery. The whole was to be built in stone, with some red brick bands on the exterior.

A. H. SKIRWORTH.

#### HOUSES AT ELSTREE AND FIFIELD.

THE house at Elstree is about to be built for Mr. Robert Warton, the materials to be employed being red-brick facings and stone dressings, the roofs being covered with Brosley tiles.

The house at Fifield, Oxon, has been built for Mr. F. Matthews, the whole of the walls being of local stone rubble, lined with Leicester bricks; the stone dressings are of Box Ground, and the roofs are covered with Naunton grey stone slates. The builder was Mr. W. Hobbs, of Chipping Norton.

Mr. T. E. Colclutt is the architect for both houses.

#### THE SURVEYORS' INSTITUTION.

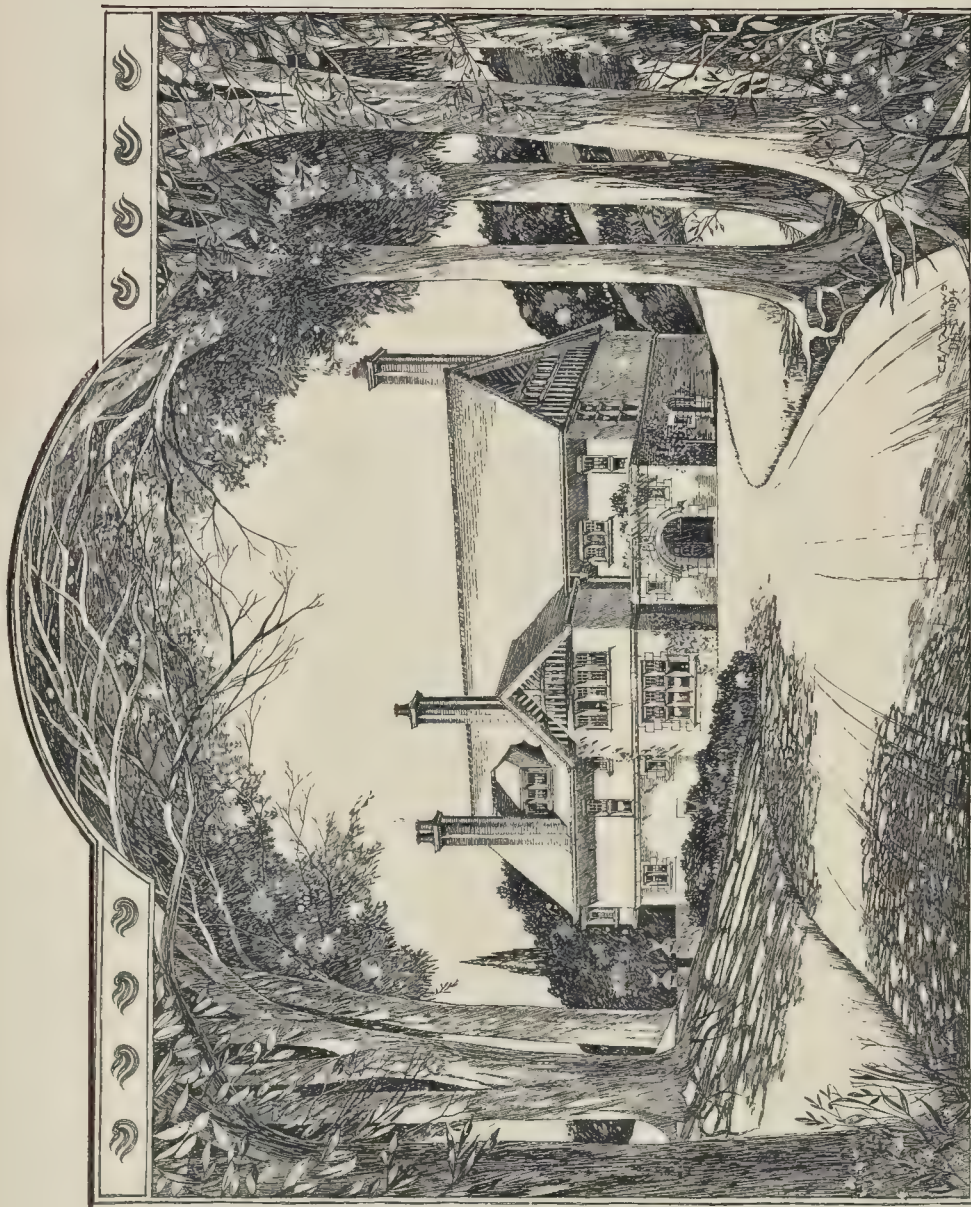
THE first ordinary general meeting of the Surveyors' Institution was held on Monday evening at No. 12, Great George-street, when the President, Mr. Thomas Chatfield Clarke, delivered the opening address. In the course of his remarks the President said:—"From a professional point of view there has been no more important piece of legislation in recent years than the 'London Streets and Buildings Act,' which received the Royal Assent on August 25 last. It may be worth while to place on record in this address the genesis of the new measure, and to indicate the leading share which the Institution has had in moulding its provisions in the various stages of its evolution. For many years past it has been felt that the Act of 1855 has been outgrown by modern requirements, and that the

existing law was insufficient for regulating many details of new construction and materials. Endeavours have been made to cure this by several auxiliary enactments, and by laws framed by the Metropolitan Board of Works, and subsequently by the London County Council, under the Metropolitan Management and Building Acts Amendment Acts, 1878 and 1882. It was felt, therefore, that the time had come for the codification of the law relating to building, and the first step taken in the matter was the production of a draft Bill under the title of the 'London Building Law Consolidation Bill,' issued by, and apparently prepared under the auspices of, the Local Government Board. Copies of this draft Bill were forwarded to the Institution, and to other societies, accompanied by a request that the Institution would furnish the Department with comments on the Bill. The Council pointed out, in reply, that what was really wanted was not consolidation, but a new Act; but, on being further pressed for suggestions, they appointed a strong Committee, who devoted a large amount of time and labour to the work of engrafting on the Consolidation Bill the additions and amendments in their opinion necessary for making it a useful working measure. The matter apparently slept until, in December of last year, the Council received copies of a new Building Bill, prepared by the London County Council, embodying some of the suggestions made by the Council of the Institution to the Secretary of State in connexion with the Consolidation Bill already referred to. The Building Committee of the Institution devoted a very large amount of time to the consideration of the new Bill, and finally nominated their colleagues Mr. Rickman, Mr. Garrard, Mr. Steward, and Mr. Cubitt Nichols to represent the Institution at a conference with the Building Committee of the London County Council, and to press the adoption of the amendments proposed by the Institution. They were met in the matter in the most friendly way by the representatives of the London County Council, but, failing to obtain concessions on some important points, they were authorised by the Council to draw up and lodge





THE BUILDER, NOVEMBER 17, 1894.



HOUSE & EL STREET





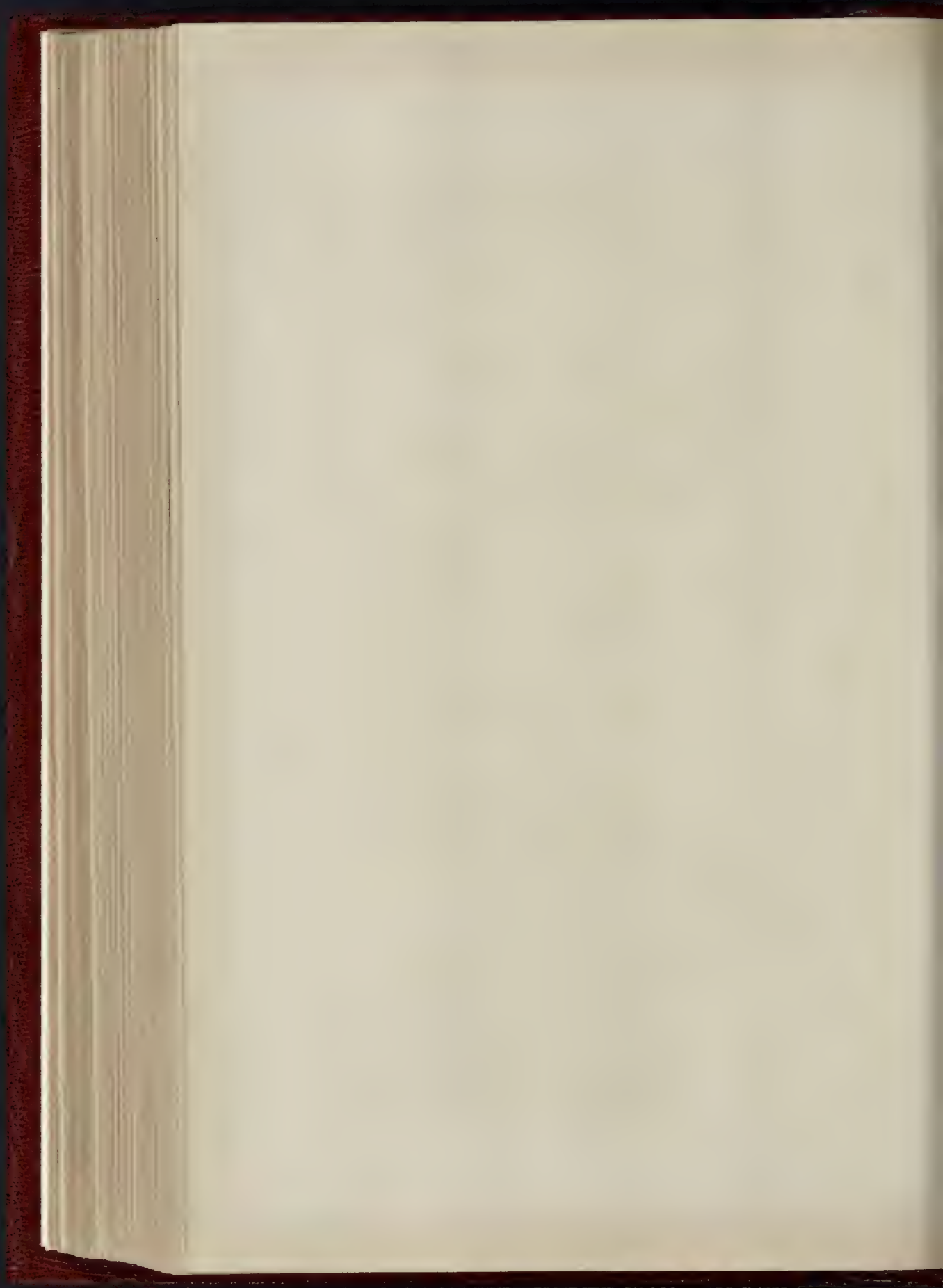
A sepia-toned photograph of a large, multi-story building, likely a government or institutional structure. The building features a prominent tower on the left side with a flag flying from a pole in front of it. The architecture is characterized by multiple windows and a complex roofline. The image is oriented horizontally on the page.

A sepia-toned photograph of a large, multi-story building, likely a government or institutional structure. The building features a prominent tower on the left side with a flag flying from a pole in front of it. The architecture is characterized by multiple windows and a complex roofline. The photograph is oriented horizontally on the page.

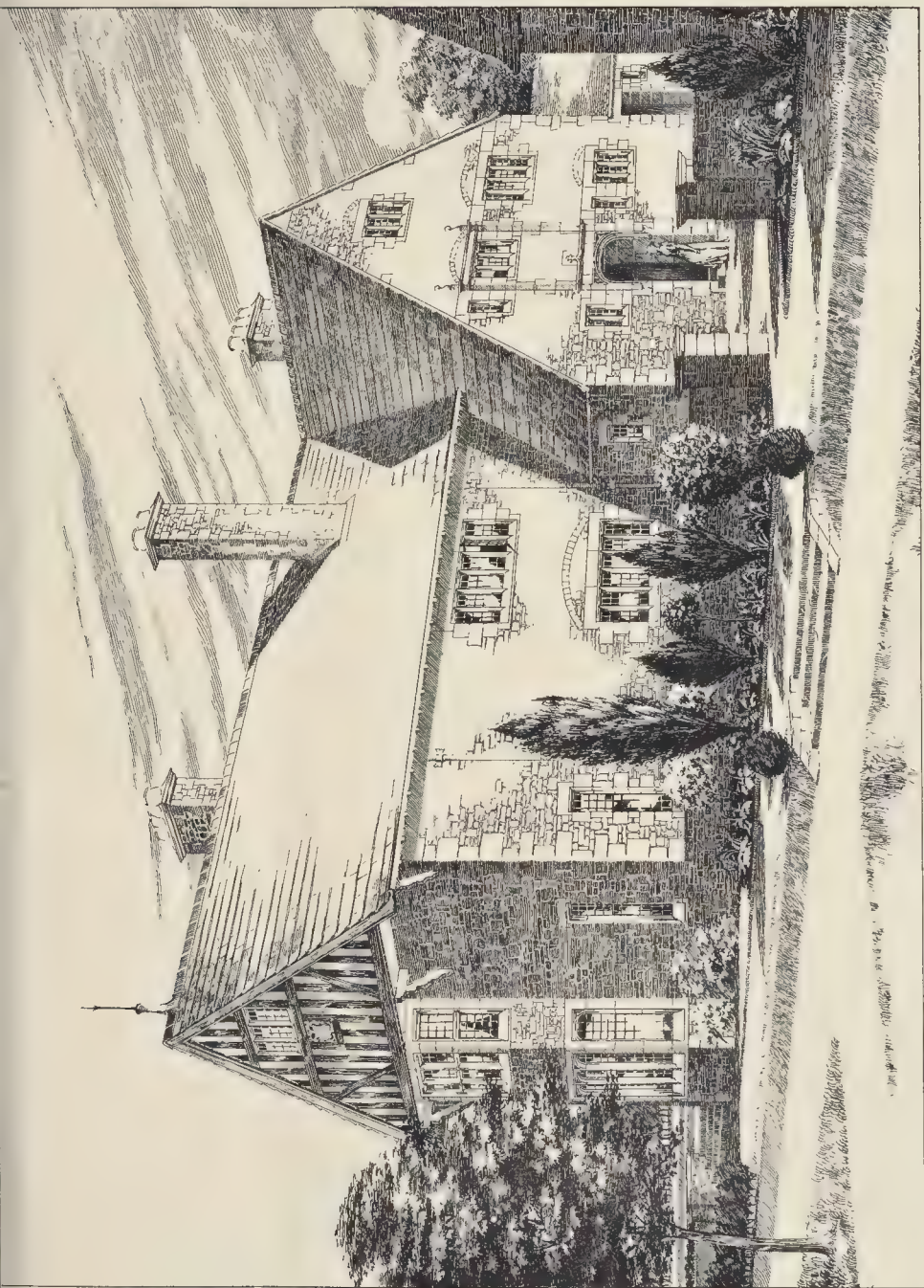




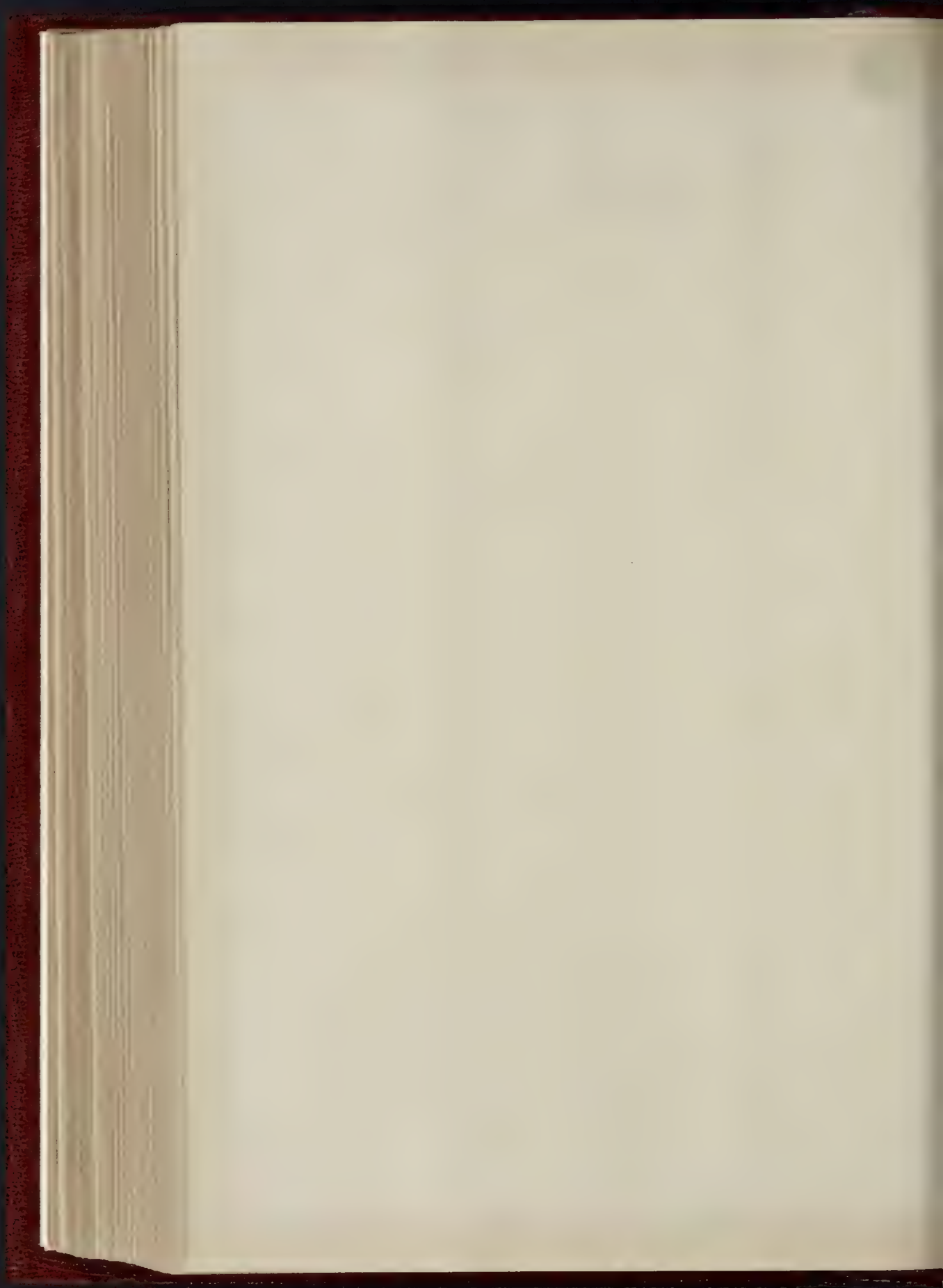




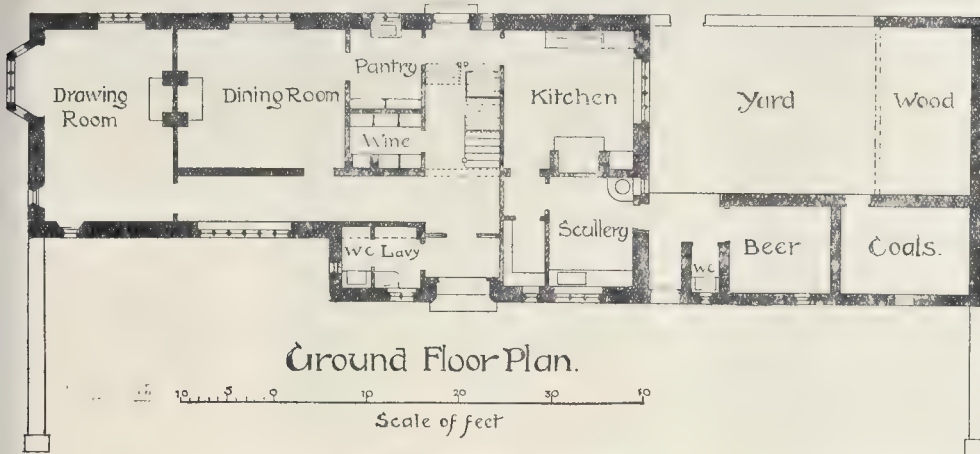




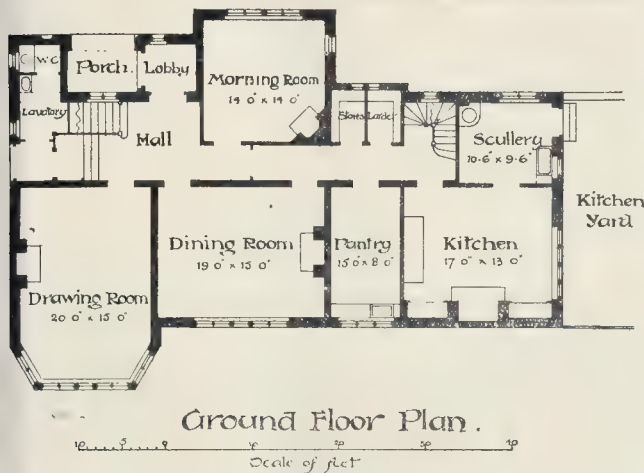
HOUSE AT FIELD, NEAR CHIPPING NORTON.—MR. T. E. COLLCUTT, F.R.I.B.A., ARCHITECT.







House at Fijfield, near Chipping Norton.



House at Elstree.

petition in opposition to the Bill. After a prolonged fight in the committee-rooms of the House of Commons, the representatives of the Institution (for this purpose Mr. Steward, Mr. Barrard, and Mr. Cubitt Nichols) succeeded, and were able to appear, in support of the greater part of it, before the Committee of the House of Lords. The Council, and particularly those members of it to whom have referred, have spared neither time nor trouble in the endeavour to secure a Building Act worthy of this great Metropolis, and, although has involved the Institution in an expenditure of nearly £1000, the members will, I am certain, feel that the money has been well bestowed. Leaving the subject I may, I think, conclude the Institution on the position accorded to it by the Act, in relation to the Tribunal of appeal. The position conceded to the Institution by the London Council General Powers Act, 1890, is greatly emphasised in the present Act by the establishment of the Tribunal on a permanent basis, and by the great enlargement of the scope of its operations. The willingness of the London County Council to refer appeals on technical matters to a Tribunal of experts may be justly said to be a strong testimony to their desire to act fairly as between the various interests involved. I suppose I shall be expected to say something on the subject of 'betterment,' although it has been discussed *nauseam*. I presume we must regard it for the present as in a state of suspended animation, owing to the action of the House of Lords in passing the clause which embodied it from the

County Council Bill; not on the ground, judging by their report on the general question, that the principle is itself unjust, but that it has not yet been clothed with any practical plan for putting it into equitable operation. It is only the extreme opponents of the principle who deny, in the words of the Lords' report, that 'persons whose property has clearly been increased in value by an improvement effected by local authorities should specially contribute to the cost of the improvement.' The whole difficulty arises from the uncertainty of the operation of a public work in raising the value of neighbouring lands, and it is noticeable that the Lords point out that the evidence of eminent valuers is in conflict on the question. I, for one, am not disposed to quarrel with some of the proposals of the Lords' Committee for protecting from possible injustice the persons to be charged with a 'betterment' rate. It is fair, for instance, that, within a reasonable time after the completion of the work, the owners of the properties affected should receive notice of the amount of the special rate which the local authorities propose to impose on them; but this does nothing to remove the difficulty of deciding whether the period is sufficiently long to adequately test the effect of the improvement, or so long (after the execution of the improvement) as to damage the market value of the property. But it is, of course, the peculiar duty and province of a surveyor to estimate and advise on such questions. I am not sure that I can give an unqualified acquiescence to the proposal to give the person to be charged the option of going before a jury; not that I have any feeling as regards the fairness of this 'Palladium of British liberty,'

but because a jury is summoned *ad hoc*, whereas the decisions of an arbitrator, dealing with all matters arising under the scheme, would be more likely to result in an equitable distribution of the charge among the various persons affected. The 'worsenment' principle is reduced to the narrowest limits by the proposal of the Lords' Committee to confine it to property, in the immediate neighbourhood, belonging to the owner charged with the betterment rate. It is not probable that many claims of this kind can arise, or could be substantiated if they did arise, and the contingency, thus limited, may, I think, fairly be disregarded in considering the question. I cannot, however, agree with the proposal that, where the 'owner is of opinion' that the charge exceeds the enhancement of market value due to the public improvement, he should be entitled to claim that the Local Authority should purchase the property in question, at its previous market value. Surely a right to compel the Local Authority to purchase should depend upon something more tangible than the 'opinion' of the owner, and I cannot think that the suggestion is put forward seriously. There can be no objection to the settlement by arbitration of any question that arises as to the incidence of the betterment charge between any of the persons entitled to different interests, though it would seem that the matter could be better dealt with by the publication of example cases after the manner, though not necessarily on the lines, of those prepared by our Associate Mr. Harper in connexion with the question of the rating of ground values. There was a good deal of evidence before the Lords' Committee with reference to the alternative principle of 'recoupment'—some of it of a very conflicting kind. The Report seems to imply a preference for this method of recovering the cost of an improvement, and a belief in its sufficiency, if the Local Authorities can be relieved of the necessity of buying out the trade interests, these having, so far, proved most costly in carrying out the large schemes in the Metropolis and elsewhere. Personally, I doubt the advisability, from the point of view of public policy, of allowing local authorities to become land dealers on a large scale, and the experience of some few years since in this direction should be a warning to avoid what then proved to be a great scandal. On the whole, notwithstanding the temporary *impasse*, I think the air has become to some extent cleared by the fiery ordeal through which the question has passed, and that a plan will yet be found of imposing, in an equitable way, a charge which most people agree is not inequitable in principle and essence, and which might operate with advantage by reducing the cost of metropolitan improvements, and thereby increasing the extent of many needed works." A vote of thanks, moved by Mr. Charles King Bedells and seconded by Mr. William Wright, was accorded to the President for his address.

THE SURVEYORS' INSTITUTION.—The Council have awarded the prize offered by Mr. T. Chatefield Clarke (the President) to Mr. Harold Castle, for his paper entitled "French Light on the English Land Question." The following papers are honourably mentioned:—"Fen Farming in 1894," by Mr. S. Stevens, and "Ventilation," by Mr. E. W. Hooper.

## THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

**Salisbury Estate, Strand, and Premises for the Council.**—The Establishment Committee submitted a long report in reference to the conclusion they had arrived at with regard to the suitability of the Liberator buildings on the Salisbury Estate, Strand, for the purposes of the Council. Having gone into all the details, the report went on to say that the Committee had now put before the Council the particulars of the accommodation that would be provided in all three blocks, and they had shown that the main or principal block, to which they were particularly requested to direct their attention, would by itself be quite inadequate for the present staff of the Council. There would also be the great difficulty of satisfactorily adapting the large room on the ground-floor for the purposes of a Council Chamber, and it would be necessary to use a portion of the eastern block for a new chamber. As regarded committee-rooms, some of the rooms on the ground floor and the one below might be adapted, but the construction of the rooms did not readily lend itself to the suggestion. The main and western blocks (which were the only blocks completed) would together accommodate 592 persons, or 110 more than were at present accommodated in the present group of offices. The value reported that additional accommodation in the neighbourhood of Spring Gardens for 110 persons would entail an extra rental of 1,760*l.*, and having regard to the cost of acquiring and adapting the Liberator building they were of opinion that it would be more economical for the Council to obtain such additional accommodation in the neighbourhood of its present office as occasion required, than to incur so large an expenditure of money as would be necessary to transfer the whole staff to the proposed building. They had, therefore, come to the conclusion that it was undesirable that the Council should take any steps for the acquisition of the buildings, and recommended "That the Council do concur in this view."

On the application of Mr. Fardell, the report was adjourned for a fortnight.

**York Water Gate.**—A report of the Parks and Open Spaces Committee stated that the Council would remember that under the London Open Spaces Act, 1893, the York Water Gate and the strip of land bounding the Victoria Embankment-gardens to the north of the gate were transferred to the Council. They had carefully considered the question of dealing with the piece of land and the gate itself, having due regard to the desirability of retaining as far as possible the gate in its present position, and at the same time making the interesting structure not altogether purposeless. The scheme which they now recommended to the Council for adoption provided for new entrances being formed to the gardens from Buckingham-street and York-building, the entrance in the latter case being through the water-gate. To enable that to be done with the gate at its present level, steps would have to be made leading to the gardens from the street. The approach to the gate from the gardens would be by two flights of stone steps meeting before the gate. The strip of land now outside the gardens would be planted with trees and shrubs, so as to take off the bare appearance of the wall on the north side. They recommended—"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the Committee be authorised to incur an expenditure of 650*l.* for dealing with the York Water Gate, Victoria Embankment-gardens, and the strip of land adjoining in accordance with the plan prepared by the Chief Officer."

This was opposed by Mr. Burns, and stood over for a week.

**Cost of Work.**—The Parks Committee brought up a report containing the following paragraph, the consideration of which, and the adjourned report of the Works Committee on the cost of work, was adjourned—

"On July 21 last we informed the Council that a question of serious importance had arisen in connexion with the works carried out at the instigation of the Parks Committee, as to the extent to which the Committee was to be able to control the expenditure of the moneys provided by the Council for the Committee's purposes in respect of works carried out by the Works Committee. Objection was taken to the recommendation with which our report concluded, and the report was thereupon referred back to us. We have now therefore to

bring the subject before the Council in another form. Under the old system of contracts the Committee knew exactly how much money would be expended on any work it ordered, or had the means of limiting the amount of such expenditure, but under the present system of the works being carried out by the Works Department the Parks Committee has no control whatever over the expenditure, the Works Committee being in the position of a person subject to no authority on the part of the Parks Committee as to the charges to be made in excess of the estimated amount for the work undertaken. In our previous report we brought to the notice of the Council the following facts connected with the erection of a lodge and conveniences at Plumstead-common. On July 3, 1892, the Council authorised the erection of a lodge, women's conveniences, and a tool-shed, together with the necessary fencing, for a sum of 1,070*l.*, the amount of the architect's estimate. Tenders were invited, and the following were received:—Messrs. W. Akers & Co., 899*l.*; Mr. H. Faulkner, 940*l.*; Messrs. L. Whitehead & Co., 945*l.*; Mr. E. Proctor, 1,077*l.*; Messrs. Bastin & Tawney, 1,080*l.*; Messrs. J. Garrett & Son, 1,299*l.*; and Messrs. Norris & Lake, 1,412*l.* On March 14, 1893, we reported to the Council that Messrs. Akers would not submit a proper schedule; that Mr. Faulkner would not carry out the work at his original estimate, but offered to submit a revised one, and that the Works Department was prepared to undertake the work. The Council, under the circumstances, entrusted the work to the Works Department. The Works Committee on April 25, 1893, reported to the Council that it was satisfied with the sufficiency of the plans, specifications, and estimate, and was taking the necessary steps to carry out the work. The work has been completed satisfactorily, and the architect has measured it up and reported to us that the cost, based upon the estimate, should have been 1,063*l.* 17*s.* 4*d.*, and that this sum is all that a contractor could have claimed under a contract for 1,070*l.* But the Works Committee has expended a sum of 1,345*l.* 0*s.* 7*d.* on the work, and the Parks Committee is asked by the Comptroller to submit to the Council, through the Finance Committee, an estimate for the excess of expenditure, viz., 275*l.* 0*s.* 7*d.* If the estimate were asked for prospective expenditure, we should have no cause of complaint, as we could determine whether the expenditure should be incurred or not, but in this case the money has already been spent by another Committee without our knowledge or consent, and we are required to acquiesce in the expenditure. The Works Committee has explained that the cost of such buildings is always very heavy in proportion to their size, as compared with other buildings, that a great amount of labour was involved in the construction, that the roofs required an amount of time in execution altogether disproportionate to the value of the work, and that the cost of cartage was very heavy. But it appears to us these were considerations which should have been carefully weighed by the Works Committee before undertaking the work, and any excess of expenditure over the estimate should not be a charge on the finances of the Parks Committee. Another cause is the erection of a urinal at Eel-brook-common. The urinal, which was lying at Deptford pumping-station, was handed over to the Parks Committee by the Main Drainage Committee, and the Council on May 9, 1893, sanctioned an expenditure of 112*l.* for its repair, transfer, and erection of the urinal, together with the provision of the necessary water supply. This work also was entrusted to the Works Department to be carried out as a jobbing work, and an account has been rendered to us for 179*l.* 1*s.* 3*d.*, or an excess of 67*l.* 10*s.* 3*d.* We referred to these two cases in detail in our previous report, they being the only works in respect of which we had at the time been asked to submit supplementary estimates. Since then we learn that five other works have been completed for us by the Works Committee, and in each case the cost has largely exceeded the accepted estimates. For convenience of reference we append a statement of the completed works:—

Name of place.	Work.	Estimated architect's fee by Works Department.	Corrected estimate after measurement of completed work.	Actual cost of work, as per statement.
		<i>l.</i>	<i>l.</i> <i>s.</i> <i>d.</i>	<i>l.</i> <i>s.</i> <i>d.</i>
Plumstead-common	Lodge, conveniences, &c.	1,070	1,063 17 4	1,345 0 7
Victoria park	Refreshment-house	1,060	1,029 5 0	1,317 15 9
Southwark-park	Cricketers' shelter	460	474 2 9	930 3 3
City-ham-common	Public conveniences	760	767 17 0	1,354 12 0
Eel-brook-common	Urinal	112	Daywork	176 11 3
Waterloo-park	Boundary wall, piers and railings	275	197 1 9	294 18 5
Dulwich-park	Carts shed	100	580 5 2	172 11 9

From this statement it will be seen that the seven works which the Works Committee undertook, and with the estimates for which it was asked to sanction, they reported to the Council that they were satisfied as to their sufficiency, have actually cost 5,697*l.* 4*s.*, an excess of 1,557*l.* 4*s.*, or no less than 37*s.* 7*d.* per cent. But when the actual cost is compared with

the cost of the measured work, or the sum which would have been paid to contractors (omitting the urinal at Eel-brook Common, which was carried out as daywork), the works will be shown to have cost 5,571*l.* 4*s.* 9*d.*, as against 4,024*l.* 9*s.*, or an excess of 35*l.* 14 per cent. For the purpose of satisfying ourselves that the estimates of our officials are reliable and reasonable, we have had prepared a return of all the works carried out for us by contractors, under the Architect's direction, since May, 1889. The return shows that eighty-two works have been so carried out, with the following result:—

Name of Works.	Original Estimate.	Gross Amount of Contracts.	Final Amount paid to Contractors.
	<i>l.</i> <i>s.</i> <i>d.</i>	<i>l.</i> <i>s.</i> <i>d.</i>	<i>l.</i> <i>s.</i> <i>d.</i>
82	52,138 8	48,944 9 5	48,722 7 5

Looking at all the circumstances, we think we are justified in calling the especial attention of the Council to the cost of the works as executed by the Works Committee. We also wish to call attention to the fact that from the moment the order for the execution of the work passes to the Works Committee, the Committee on whose behalf the work is being done loses all control over the cost, and may find itself charged with amounts it would not have sanctioned. On inquiry we find that the whole of the expenditure in excess of the estimates accepted by the Works Committee has already been charged in the Council's books of account against the moneys provided for the use of the Parks Committee during this year, and that it is necessary for us to obtain the sanction of the Council to the expenditure. Having, therefore, according to the present practice, no option in the matter, we recommend—

"That the Committee do not proceed to carry out the works which are estimated to cost more than the sum provided for their execution, and that they do not incur any expenditure on such works without the sanction of the Council."

The Council adjourned at 7.30 o'clock.

## ARCHITECTURAL SOCIETIES.

## BIRMINGHAM ARCHITECTURAL ASSOCIATION.

—On the 2nd inst. Mr. William Hienman, President of the Birmingham Architectural Association, delivered an address to the members of that body at their first meeting for the Winter Session, 1894-5. In the course of his remarks he mentioned that in the spring of next year the Royal Institute of British Architects would conduct an examination to qualify for candidature as Associate on new lines, and urgently recommended all members of the Association who were qualified and had not yet entered upon active practice to submit themselves for examination at the earliest opportunity. No greater mistake could, he said, be made by a student in architecture than to defer this test until the pressure of actual business made it so excessively arduous that he was compelled to forego it. Now that it was realised that examinations should be proof of knowledge rather than tricky traps to trip the timid, the Institute had, in his opinion, done well to make them progressive, viz., preliminary, intermediate, and final. Now, membership of the Royal Institute of British Architects could only be secured after success in examinations, and none should look slightly upon that distinction; because now that the scheme had been fairly launched the public would assuredly in time come to realise its importance, and although one here and there, highly gifted, might possibly attain success, without having officially proved his mettle, the ordinary practitioner who had no done so would undoubtedly be heavily handicapped, and even the genius might thereby suffer.



of many, themselves included, for there was scarcely a phase of civilised human existence which was not made more healthful and pleasant or the reverse in proportion to the knowledge, ability, and care of the architect. Every well-designed building, carried out with care, developed continually a desire on the part of communities for other attempts to be made. It was true that rivalry was set up, but not always of an objectionable character. The desire to excel not only resulted in work for architects, but added to the importance and welfare of our cities and towns. It would therefore be a good thing if every Local Authority truly realised this and that their laudable ambitions were ably given expression to by every architect. Communities would then consider it a reproach if their public buildings could with reason be adversely criticised. Individuals would vie with one another to have architecturally good and convenient business premises, as well as private dwellings, and capable architects would be honoured and patronised as they deserved. Some advance in this direction had, during the last few years, been undoubtedly made, but that love of money which was the root of all evil, and the bane of good architecture, not only stifled the art, but disfigured every building with hideous signs and letterings which made offensively prominent the names of those devoid of good taste and puffed their questionable wares. The time had come when the public should protest against the display of this vulgarity, and Local Authorities should obtain powers to suppress it as in old times. Acts of Parliament were passed to curb the excessive display of signboards, which, compared with modern advertising methods, were greatly to be preferred for their generally artistic treatment and effect.

**SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.**—The ordinary monthly meeting of the members of this society was held at the School of Art on the 13th inst. The chair was occupied by Mr. E. M. Gibbs, the President, who delivered an address on the recent events connected with the profession in the city. Mr. Hugh Stannus, of London, gave a lecture on "The Three Greek Orders—Doric, Ionic, and Corinthian"—and showed by means of models, diagrams, and sketches on the blackboard the early origin and the development of each, with its capability of use in architecture. A cordial vote of thanks was passed to the lecturer, on the motion of Mr. H. W. Lockwood, seconded by Mr. Peter Marshall, supported by Mr. J. T. Cook, Mr. J. R. Wigfull, and Mr. T. Winder. Ballots took place and the following new members were elected, viz.:—Messrs. W. R. Bryden, F.R.I.B.A., F.S.A., Buxton, as Fellow; W. G. Buck, Sheffield, as Associate; and Arthur Appleby, Sheffield, S. L. Chipping, Sheffield, J. W. E. Clayton, Chesterfield, and G. F. Day, Sheffield, as students. Messrs. G. J. Gillham, Sheffield, as Associate, and Thomas Robinson, Sheffield, as student, were proposed by the President and seconded by Mr. C. J. Innocent, the Hon. Secretary, to be balloted for at the next meeting.

**CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING ASSOCIATION.** The opening meeting of the 1894-5 session of this Association was held in the Town-hall, Carlisle, on Nov. 7, when the President, Mr. Claud Lonsdale, delivered the initiatory address. The new President referred to the gradually-increasing success of the Society in previous years, to the great usefulness of the papers read before the members, and hoped that the new session would be marked by a still greater improvement in the status of the Society, which might greatly extend its sphere of operations by including in its programme visits to works and places of architectural interest during the summer. The lecturer also referred to the collection of book-plates as a hobby well worth taking up, and also described the various processes of engraving from the earliest times down to the present day. A vote of thanks to the President for his address concluded the proceedings.

**PLYMOUTH SCHOOL OF ART.**—The scheme of architectural education recently organised by Mr. Henry R. Babb, head-master—giving facilities to young architects in preparing for the intermediate and final examinations of the Royal Institute of British Architects—commenced on the 8th inst. Mr. B. Priestley-Shires, A.R.I.B.A., delivered the opening lecture of a course on the "History of Architecture, including an analysis of Mouldings, Features, and Ornament." After explaining the object of the R.I.B.A. examinations, and giving a few remarks upon the value of study, Mr. Shires said the history of architecture

alone—literary and archeological—was sufficient for a lifetime. Thus they would trace its rise and progress, from the first efforts of barbarians in forming their huts with branches of trees, covered with mud, and without light and air; or the rock-hewn habitations of others, in contrast with the temples of the Greeks, the basilicas of the Romans, the cathedrals of Medieval times, and the gorgeous palaces of the Renaissance. The history of architecture was the history of civilisation, and before the invention of the art of writing, architecture was the great and only reliable historian of the world's progress. The history of architecture told of the beauty of Greek art and the splendour of the Roman Empire; it testified to the religious enthusiasm and devotedness of the Middle Ages. Mr. Shires dwelt at length on the different forms of Greek temples and some of the more important ones stated, the dates and architects, sculptors, &c., connected with them.—At these meetings a wish has been expressed that the three towns should have an architectural association of its own—as the nearest one available is at Exeter, and very inconvenient to members of the architectural profession in Plymouth, Stonehouse, and Devonport.

## Correspondence.

To the Editor of THE BUILDER.

### GROUTING OF STREET PAVEMENTS.

SIR,—In your remarks of to-day's issue (under "Notes") upon my annual report, you have conveyed a wrong impression to the readers of your paper, which I shall be glad if you will rectify.

The wood-pavements referred to by me have not been laid in either "Wellington-street" or "White-hall," but in the Strand, Long Acre, Trafalgar-square, &c. I further thoroughly agree with Mr. Blair as to the advantages of pitch composition over cement as a grouting material.

Mr. Blair's summary of replies in his report give my opinion (on page 5) as follows:—"Until the last piece of work has used cement grout, but infinitely prefers bituminous joint for both wood and granite; hopes to use this always in the future," which proves that I am a great advocate for the bituminous joint. In my report I refer to the "close-jointed" system, and not to the grouting material, which your quotation as to concussion and vibration proves.

May I trespass further upon your space by asking you also to correct the impression you convey as to my remarks upon street-lighting and cleansing pavements by flushing? In reporting upon the former I say "the cost of electricity (for lighting purposes) will exceed the amount now paid for gas," and my reference to street-flushing is as follows: "the cost of water, however, is such that a regular and systematic washing . . . may not be as economical as the present methods of street-cleansing"; whereas you quote me as saying "the cost of water is too great for a further application of the system."

CHAS. MASON.

Town Hall, Charing Cross, November 10, 1894.

\* \* In regard to the two latter points we did not profess to quote Mr. Mason's words; we stated in our own words what seemed to be the natural deduction from the terms of the report. As to the main point we deny that we have conveyed any wrong impression at all. Mr. Blair stated that the pitch-grout joint absorbs expansion and gives way to contraction of the wood, so that no movement is transferred to the channels, and no pressure brought to bear against the kerb to cause displacement, and it is more elastic than the cement and does not wear the edges of the blocks. Mr. Mason says that close jointing with Portland cement causes less concussion and vibration than when laid with a joint ("with a wide joint" we presume he means), and that the life of the pavement is longer; which are pretty much the same advantages that Mr. Blair claims for the pitch-joint. Whether that is not a contradiction of opinion we will leave our readers to judge.—ED.

### A WARNING.

SIR,—A man I find is calling on various architects and builders representing himself to be a son of the late Sir Gilbert Scott and asking for assistance, though, as far as I have heard, without success. I need hardly say that he is an impostor.

J. OLDRID SCOTT.

**THE "EARL OF ESSEX'S BATH."**—In reference to the Note on this subject in our last issue, Messrs. Dorrell & Co., builders, inform us that the marble linings of the bath, and the old Purbeck paving, were taken out last year, and the marble was used as far as it would go in lining the Roman bath adjoining, which was also repaved with the old paving of the Essex bath, under the direction of Mr. Loftus Brock. Messrs. Dorrell have kindly sent us a photograph taken of the Essex bath before it was destroyed.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XX.

#### HOUSE CONNEXIONS AND FITTINGS.

**IN** order to secure satisfactory results in a waterworks undertaking, it is necessary to keep a strict control over the connexions that are made by consumers with the undertakers' pipes for the purpose of obtaining a supply of water for domestic or other purposes. Waste is the *lâche noie* of the waterworks engineer, and experience has shown that its favourite lair is to be found in the communication-pipes, taps, cisterns, and overflow-pipes connected with house and trade supplies.

As indicated in Chapter XIX., the difficulty, where it applies to trade connexions, can be satisfactorily met by the insertion of water-meters, and by charging for the actual quantity of water delivered to the premises in question. When persons have to pay for water by meter whether used or wasted, it becomes to their interest to detect the sources of waste; on the other hand, it is against the immediate interest of owners of house property to detect leakages or faulty fittings, which they would have to repair or replace at their own cost, without obtaining thereby any reduction in their water-rates.

To enable a Local Authority, *inter alia*, to suppress waste, the Waterworks Clauses Act, 1863, and certain provisions of the Waterworks Clauses Act, 1847, were incorporated with the Public Health Act, 1875. These enactments afford very meagre powers to Local Authorities as far as giving them any control of domestic services is concerned. It is customary for the undertakers, when seeking for a special Act, to apply for extended powers. These powers, when obtained, are set forth in the form of "water regulations," to be considered in the next chapter. It may here be observed, parenthetically, that no provision is made in the Public Health Acts empowering Local Authorities to make water regulations.

The sections of the Waterworks Clauses Acts (1863, and part of 1847) directly or indirectly enabling Local Authorities to place some check upon the waste of water in domestic services, are the following:—

*The Waterworks Clauses Act, 1847.*

Sec. 28 Empowers the undertakers to break up streets, &c., for the purpose of supplying water to the inhabitants of the district.

Sec. 44 Requires the undertakers to lay down communication pipes and other necessary works to any dwelling-house (under *rol. rental*) situated in any street where they have laid pipes (i.) either at the request of the owner, or (ii.) at the request of the occupier, and upon payment or tender of the proportion of water-rate in respect of such house by this or the Special Act, made payable in advance. Such reasonable annual rent for such pipes to be charged as may be agreed upon, or as may be settled by two Justices.

Under these circumstances, the undertakers are enabled to employ efficient workmen and fix proper fittings.

Sec. 48 Empowers the owner or occupier, having paid or tendered to the undertakers the portion of the water-rate as indicated in Sec. 44, to open the ground and lay leaden or other communication-pipes between his premises and the undertakers' pipes, provided

1. That he has obtained the consent of the owner and occupier of the intervening ground;
2. That the pipes are of a strength and material to be approved by the undertakers;
3. That fourteen days' notice has been given to the undertakers.

Sec. 49 Requires the owner or occupier to give two days' notice of day and hour when communication is intended to be made. Communication to be made under superintendence and according to the directions of the undertakers' surveyor, or other officer appointed, unless such surveyor or other officer fail to attend at the time mentioned in the notice.

Sec. 50 Enacts that the bore of such communication-pipe shall not exceed the prescribed limits; or, if no limit has been prescribed,  $\frac{3}{4}$  in.; except with the consent of the undertakers.

Sec. 52 Gives owner or occupier the same privileges as the undertakers as to breaking up roads.

It will be evident to the Student, after a perusal of these Sections, that the undertaker's control over a domestic supply is limited to the communication-pipe, and does not extend to the fittings.

Sec. 54 Applies only to intermittent systems, and enables the undertakers to require the consumer to provide a proper cistern, ball and stop cock, and



to keep them in repair. It has been held that the undertakers cannot enforce the provision of a valve instead of a plug-cock.

Sec. 56, in continuation of Sec. 54, empowers the undertakers to repair such cistern, and to recover the expense.

Sec. 57 Gives power of entry to the surveyor or other person acting under the authority of the undertakers, for the purpose of detecting waste or misuse of water.

Secs. 58 and 59 Impose penalties on misappropriation of the water; and

Sec. 60 Imposes a penalty upon any person who shall wilfully or carelessly break, injure, or open any lock, cock, valve, &c., the property of the undertakers.

*The Waterworks Clauses Act, 1863.*

Sec. 12. A supply of water for domestic purposes shall not include a supply of water for cattle, or for horses, or for washing carriages where such horses or carriages are kept for sale or hire by a common carrier, or a supply for any trade, manufacture, or business, or for watering gardens, or for fountains, or for any ornamental purpose.

Water used for watering a horse and washing a carriage has, however, been held to be used for "domestic purposes" within the meaning of an enactment similar to the above section. Water used for a pleasure garden was held to be for a "domestic purpose."

Sec. 14 Gives the undertakers power to let meters, cisterns, pipes, &c., on hire.

Sec. 16 Empowers the undertakers to cut off the supply, if any of the provisions of the Act are contravened.

Sec. 17 Imposes a penalty upon the consumer for waste of water through non-repair of pipes, taps, &c.

Sec. 18 Imposes penalty upon misappropriation of water.

Sec. 19 Imposes penalty upon any alteration to service, as follows: "It shall not be lawful for the owner or occupier of any premises supplied with water by the undertakers, or any other person, to affix, or cause or permit to be affixed, any pipe or apparatus to a pipe belonging to the undertakers, or to a communication or service-pipe belonging to or used by such owner, occupier, consumer, or other person, or to make any alteration in any such communication or service-pipe, or in any apparatus connected therewith, without the consent, in every such case, of the undertakers."

Sec. 20 Imposes a penalty upon any person using the undertakers' water without agreement.

The powers possessed by a Local Authority for the prevention or suppression of waste in domestic connexions may be summarised as follows:—

1. Where the dwelling-house is under 10<sup>l</sup>. rental, and a request has been made by the owner or occupier for a supply of water, the Local Authority have control over workmanship, materials, and choice of fittings.

2. Where the owner or occupier makes his own connexion, the Local Authority may superintend the communication or junction with their pipes, in such case the communication to be made under their direction. The communication-pipes to be of a strength and material to be approved by the undertakers, the bore not to exceed the prescribed limit, or, if no limit,  $\frac{3}{4}$  in.

3. The Local Authority has power to enter any house supplied by them with water, between the hours of 9 a.m. and 4 p.m., for the purpose of detecting waste or misuse of water.

4. Where the supply is intermittent the Local Authority may require the provision of a proper cistern to hold the water so supplied with a ball and stop-cock in the pipe bringing the water from the works of the Local Authority to such cistern; also to require that such cistern, &c., shall be kept in proper repair so as to prevent waste; also to, themselves, repair such cistern, &c., and recover the expense.

5. Power to impose a penalty for waste of water through non-repair of pipes, &c.

6. Power to impose a penalty for any alteration to service without the consent, in each case, of the Local Authority.

7. Power to cut off the water if any of the provisions of the Act are contravened.

These powers are utterly inadequate to the proper control over a waterworks, and as it is unusual for a Local Authority (especially a Rural Authority) to go to the expense of a Special Act, so-called "Water Regulations," which, however, cannot be legally enforced, are not infrequently formally passed and published by the Local Authority, and generally attain the required result.

To meet the difficulty of not having sufficient control over domestic fittings, a system of testing and stamping fittings was introduced in 1883 by Mr. Ernest Collins, M.Inst.C.E., the Engineer to the New River Company (London). Mr. Collins says "The system then introduced has

developed extensively; and there has been a material improvement in the quality of the fittings. Manufacturers who were at first antagonistic to the arrangements, have become strong supporters of the system; inasmuch that the use of unstamped and unstamped fittings is, in the district of the company mentioned, almost the exception; and where such fittings are used, they are invariably of the same strength and proportions, and in accordance with the regulations adopted by the company."

The same system had been previously (1873) introduced at Liverpool, with the same object, by the engineer, Mr. G. F. Deacon, M.Inst.C.E. Of this system, Mr. Deacon says:—"Very little difficulty was experienced. Naturally the plumbers at first rebelled, but in a short time they were glad to have their names put on the backs of the waste-water notices."

Where new connexions are to be made with the undertakers' pipes for domestic or other supply, it is now almost universally the practice for the undertakers to tap the main themselves, and lay, at their own expense, the communication-pipe to the fence or frontage wall (if there be one) forming the boundary of the street or highway in which their main is situated. At the termination of the pipe a stop-cock is fixed, to which the consumer attaches his own work. There has been much discussion as to the advisability or otherwise of the practice of fixing outside stop-cocks, but in a rural system, at any rate, there can be little doubt as to its usefulness. The principal advantages are (1) Facility with which water can be turned off by the undertakers in the case of waste, or when premises are unoccupied; (2) Facility afforded for detecting waste in mains or connexions. This stop-cock, and all other cocks or taps used throughout the premises, should be of the screw-down type. The following are the requirements of the New River Company:—"All taps must be fitted with loose valves; and such valves must be lifted by the spindle, and must not be

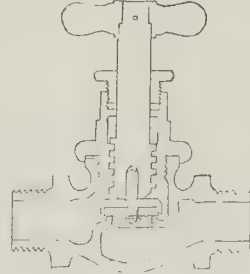


Fig. 52.

dependent upon the pressure of water for opening. They must be fitted with washers of oil-dressed leather, and for hot water with vegetable fibre of the best quality. Stop-taps must have set screws to secure flanges. The word 'inlet' must be distinctly marked on the inlet side of the tap. They must be made with screwed ends and unions. Spindles must, in all cases, be of gun-metal. All other parts may be of brass, of good suitable quality. Screw-down fittings must have four threads of spindle in the cover when closed" (fig. 52).

It is essential that all overflow pipes from cisterns, baths, &c., be constructed as warning-pipes—the mouth of such warning-pipe to be conspicuously placed so that any waste cannot fail to draw immediate attention. On no account must any overflow be allowed to escape directly into any waste-pipe or drain. An important point is to see that all pipes are properly protected from the action of frost. This is rarely attended to, and consequently the waste during the winter months from burst pipes and taps, as well as the unnecessary expenditure of water caused by leaving taps running to prevent what should have been rendered impossible, is often enormous.

Instead of making a separate connexion for each house, where the houses are close together and are of small rental, it is usually the custom for the undertakers to erect stand-posts or pillars from which the inhabitants of the houses can obtain their supply.

To facilitate this practice Sec. 9 of the "Public Health (Water) Act, 1878," enacts as follows:—

"Where a Rural Sanitary Authority have provided a stand-pipe for the supply of water to any portion of their district, they may recover water-rates or water-rents from the owner or occupier of every dwelling-house within 200 ft. of any such stand-pipe, in the same manner in all respects as if the supply had been given on the premises.

Provided that if any such dwelling-house has, within a reasonable distance, and from other sources, a supply of wholesome water sufficient for the consumption and use of the inmates of the house, no water-rate or water-rent shall be recoverable from the owner or occupier of the house unless and until the water supplied by means of such stand-pipes is used by the inmates of the house."

Stand-pipes consist of a  $\frac{1}{2}$ -in. or  $\frac{3}{4}$ -in. pipe running up a post or convenient wall terminating in a tap fixed at such a height as will easily allow of a pail or bucket being placed under it when being filled (fig. 53). The pipe is protected from the frosts

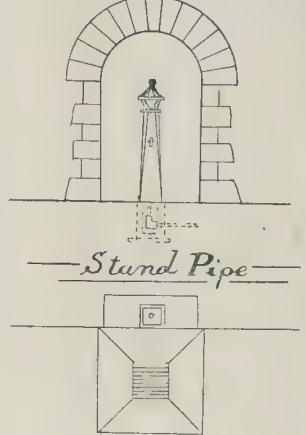
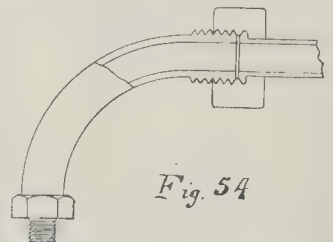


Fig. 53.

by means of a wooden or iron casing—the space between the casing and the pipe being filled with sawdust or other non-conducting substance. The stand-pipe frequently consists of a strong cast-iron hollow pillar the foot of which is firmly bedded into the ground, the water-pipe passing up the centre. The tap for drawing off the water may be either a screw-down valve-cock or a self-closing cock. The latter is sometimes unsatisfactory with very high pressures. A stop-cock should always be inserted between the main and the stand-pipe to cut off the supply when the latter is being repaired. A grating should be placed under the tap, with a drain to carry away the waste water. A small tap is frequently placed at the foot of the stand-pipe to act as a frost-cock; the stop-cock is closed and the water in the stand-pipe emptied by allowing the water to flow away into the drain by means of the frost-cock.

Small connexions are generally made with the mains by means of ferrules, which consist of small brass elbows, one end of which is screwed



(fig. 54) into a hole drilled and tapped into the top of the main; the other end has a union for attaching to the lead or wrought-iron service-pipe.

ALTERATIONS TO HOTEL, HASTINGS.—T Hastings Queen's Hotel has recently undergone alterations under the supervision of Mr. Arthur Wells, architect, of Hastings.



GENERAL BUILDING NEWS.

ALL SAINTS' CHURCH, NORTH PEKHAM.—On the 1st inst. All Saints' Church, Davey-street, Summer-road, was consecrated by the Bishop of Rochester. The church is built of red brick and Bath stone dressings, and is in the Early English Gothic style. The architect was Mr. Walter Prynne, of the scaling office, 10, Abchurch-lane, London, E.C. 4. The choir and sanctuary are provided with a high altar and reredos within a polygonal apse. The nave walls and roof are continuous with those of the chancel, and the roofs are of solid timbers and wagon-headed type. A groined and vaulted crypt is arranged under the choir and sanctuary. The organ is in a staircase, the north-east corner. This part of the building will form the choir vestry, and be also used for religious instruction. The ridge line of the roof is continuous from east to west, with a leaded bell-turret and spire over the chancel arch some 45 ft. high. For the daily services the organ is to be placed in the chancel, the south-east angle. Under the western arcade is the baptistery, and there are two side aisles and a north-west porch. The seating and choir-stalls are constructed of oak, and the stained-glass windows by Messrs. Clayton & Bell are placed in the apses of the sanctuary, morning chapel, and baptistery. The organ is to be placed in the north-east corner, the organ-loft in the north transept, by Messrs. Norman Brothers & Beard, of Norwich. The pulpit is of wrought-iron, and this and the other ironwork is by Mr. W. Bainbridge Reynolds. The tiling was supplied and laid by Messrs. Millington, Wexham, & Co., of Wokingham, Surrey. The staining glass throughout the church have been executed by Messrs. Daymon & Son. The mosaic panel in the reredos is from a cartoon by Messrs. Clayton & Bell, the subject being "The Last Supper." The heating has been executed by Messrs. Wonnier, Smith, Grey, & Co., the contractors for the heating, and Messrs. Daymon & Son, of North Norwood. The church, with clubhouse and equipment, is stated to have cost more than 30,000*l.*

ment, is situated on the site of the old Fleur-de-Lis, Monmouth. The Bishop of Llandaff consecrated recently the new church, dedicated to St. David, situated between Fleur-de-Lis and Pengann. The new church is built on Cae Twmpin. The church will seat 400 persons, and is designed in the Perpendicular style, and consists of nave, chancel, and vestry, with entrance-porch and bell-turret. The external walls are built of rubble, and the windows are of the fourteenth century freestone dressings. The chancel floor is laid with tessellated tiles, and the windows in the nave and chancel are filled with cathedral stained glass. Above the altar a three-light memorial window has been placed to the memory of the late Mr. and Mrs. David Anthony, of Fleur-de-Lis House. The whole of the wood-work is stained and varnished. The cost of the church is 1,000*l.* The building contractors were Messrs. Thomas Williams & Sons, of Cardowen, Newbridge, Mon., and the whole of the work was carried out under the supervision of the architect, Mr. E. M. Bruce-Vaughan, of Cardiff.

**LODGING-HOUSE, 105, VAUGHAN STREET, LEITH.**—The model lodging-house, which has just been erected by the Corporation of Leith in Parliament-street was opened on the 29th ult., by Bailie Archibald. The building is 50 ft. in length by 43 ft. in breadth, and is divided into two floors, the basement, and the ground-floor. On the basement-floor there is a cooking and dining-hall, 38 ft. in length by 34 ft. in width, furnace-room, clothes-drying apparatus, men's washing-house, and house washing-house, with two open airing-courts. The ground-floor is 50 ft. in length by 43 ft. wide is situated on the ground-floor. An entrance hall gives access to the building. Lavatories, bath-rooms, superintendent's house and office are also provided. The three floors above consist of dormitories. There are six dormitories, each with 16 beds being fitted up in each, making in all 96 beds. The lodging-house is supplied with fire-hydrants, and low-pressure heating apparatus. The plans were designed by the late Mr. James Simpson, and were executed by his son, Mr. James Simpson, junr. The estimated total cost of the building and furnishings is between £5,000, and 6,000*l*.

**CLERGY HOUSE, LEEDS.**—A corner-stone of a new clergy house, to be built in connexion with the Leeds Parish Church, was laid on the 5th inst., by Lady Frederick Cavendish. The site of the new building is at the rear of the church, facing into the Calls. The architects for the building are Messrs. J. & W. G. Smith, of the County Buildings. The new wing, which contains the Council-chamber, has been carried out in Late Decorated style throughout, and is built with best red facing brick: from Messrs. J. King & Co., of Stourbridge, and with Ancaster stone dressings on the exterior, the whole of the interior corridors and staircases being lined with the same. The building is well lighted by overhead gasolene lamps. The general arrangement of the reception-rooms and offices is as follows:—The Mayor's entrance under

The tower provides access to a hall with porch, supported by glass screen doors with the town arms thereon. A porter's lodge is provided here and a small waiting-place. These are enclosed by an arcading of three arches, supported on polished red granite bases and shafts. The Town Surveyor's private office and two of his drawing offices are open out on to the hall, and are accessible with the public or Town Hall is also provided. The grand staircase provides communication with the Council offices on the first floor. Two cloak-room lavatories, tiled throughout on the walls by Messrs. Minton, Hollins, & Co., of Stoke, have been provided off the staircase, and fitted up with oak screens, Devonshire-marble ranges, and brass basins. Two committee rooms, two cloak-rooms are provided on the upper floor, together with the Mayor's parlour, finished in wainscot-oak, and his worship's retiring-room. The town-clerk's office is in close contiguity to the Council-chamber, and from which access is obtained at the north end to another corridor with separate staircases to the lower floor and to the public entrance from the street. In this corridor are the Mayor's office, the lower clerical staff, strong-room, stores, lavatory, and office for the medical officer. Two spare offices are provided on the second-floor. In the new wing on the ground-floor, which has a separate entrance from the street, are the public rates' office, and other offices for officials. A house for the caretaker is also incorporated with the block of offices. The stairs, vaults for hanging the armorial bearings, and the entrance to the basement. The Council-chamber, 53 ft. by 30 ft. and 21 ft. in height, is panelled in oak throughout from floor to ceiling, turned and wax-polished, and the whole of this work has been executed by Mr. J. Thompson, of Peterboro'. It is divided into five bays at the sides and three at the ends. Nine of the side bays are filled with three-light windows, enriched with painted glass. The armorial bearings of the Mayor of London, and contain shields charged with the armorial bearings of the Mayors who have passed the chair since the charter of incorporation, and continued by other shields charged with St. George's Cross, to be removed and filled as other Mayors succeed to civic responsibilities. The east end of the room is divided from the main part by three arches, and a separate public entrance is provided. The work in the ceiling has been carried out by Messrs. Cordingley & Son, of Bradford, and it has been decorated in ivory and white and gold by Mr. Powell, of Lincoln. Messrs. Hardman & Powell, of Birmingham, are responsible for all the polished bronzed fittings and furniture, and Messrs. Homan & Rodgers, of Manchester, for the polished oakwork, as well as for all the proof floor throughout this building. The chairs in this room are all upholstered in crimson leather, with the Corporation monogram in gold, and have been executed and supplied by Messrs. Chamberlain, King, & Jones, of Birmingham, from the architect's designs. The office fittings, which are all in oak, have been executed by Messrs. Lowe & Son, under the combined instruction of the Town Surveyor, the architect, the architect's draughtsman, Mr. Reginald Churchill of Burton-on-Trent. The electric installation throughout the whole block of buildings has been carried out by Messrs B. Verity & Sons, of London and Birmingham. The Town Hall portion of the premises has not been considerably altered from its original state as St. Paul's Institute. Thorough renovation has been carried out, and the new entrance has been carried out. There have been erected at the main entrance. This room is 80 ft. by 40 ft. There are also seven ante-rooms attached. Attached to this portion of the building is the annexe or reception-room—63 ft. by 23 ft. 6 in. The whole of the works have been carried out under the architect's personal superintendence, with Mr. S. Needham as clerk of the works, and Mr. J. Picken as clerk of the works. The architect is Mr. J. Picken, who has executed the plumbing, painting, &c.; Messrs. Nicholls & Clarke, of Shore-ditch, London, the lead-up lights and other glazings; Messrs Baird, Thompson, & Co., of Birmingham, the hot-water arrangements, which are on the low-pressure system, with Beeston radiators supplied direct from Beeston, Nottingham. The oak and stone lining of the room has been executed by Messrs. Roddis, of Birmingham. The general contractors were Messrs. T. Lowe & Sons, of Burton-on-Trent.

**INFECTIOUS DISEASES HOSPITAL, STRATFORD-ON-AVON.**—On the 8th inst. the new infectious diseases hospital in the Birmingham-road, Stratford-on-Avon, was opened. The buildings consist of five separate blocks. These are (1) the administration block; (2) suite of offices, embracing disinfecter, washing-house, laundry, mortuary, and discharging-rooms; (3) scarlet fever pavilion block; (4) diphtheria block; (5) typhoid, quarantine, or private patients' block. These blocks are all isolated and separated from each other, the infected buildings having the 40 ft. zone separating them from the others. There are enclosures within the fence which is about 1½ acres, and the standard number of patients to be accommodated is twenty (the population to be served by the hospital being about 22,000). The accommodation afforded by each block consists

of a male and a female ward, separated by a nurses' duty-room, with fixed inspection-windows overlooking the wards. Attached or appended to each ward are small wings containing bath-room, lavatory, and water-closet, covered verandahs in front. The scarlet fever wards contain 150 superficial feet of floor space and 2,025 cubic feet per patient, the typhoid fever wards 1,000 superficial feet and 2,700 cubic feet per patient. The wards are all ventilated by double-hung sash-windows, with hopper fanlights above, inlet gratings at or near to the floor level beneath each bed, the outlet ventilation being by vertical shafts through the roof, and air-flues placed between the smoke-flues of each ward. All vertical angles and most of the horizontal angles above beds and over the ward windows is a double Shorland's Manchester warm-air grate. The walls are built hollow, and are plastered internally with adamantine cement plaster, finished with Duresco distemper. The floors are of narrow-boarded pitch-pine, waxed and polished on the surface. The baths are of the hospital "wheel" type, and, standing in the lavatory or bath-chamber, may be used for hot or warm water, or cold water, as the patient desires. The hot-water is generated by gas-boilers of the multitubular description, placed in the passages, and serve the double duty as generators of hot-water and heating the passages and wings. The hot-water pipes are passed along the wall of the water-closet to heat closet and prevent freezing. The total cost has been £5,640. The buildings were designed and constructed in accordance with the general instructions received from the joint committee by the architect Mr. A. H. Campbell.

**RESTORATION OF BASLOW CHURCH, DERBYSHIRE.**—After undergoing internal restoration, the parish church of St. Anne, Baslow, was reopened on the 10th inst. A couple of months ago the edifice was placed under the care of Mr. J. D. Webster, architect, of Sheffield, Mr. Samuel Hibbard, of Baslow, having been entrusted with the contract. The new oak reredos was designed by the architect.

**BAPTIST CHAPEL, HILLHEAD, LANARKSHIRE.**—On the 10th inst. Mr. J. Parker Smith, M.P., laid the memorial-stone of the new mission halls in connexion with Hillhead Baptist Church. The halls, which have been designed by Mr. Bryden, architect, Glasgow, are situated in Douglas-street, Partick.

**SCHOOLS, HORNSEY.**—The Stationers' Company have recently built a new school at Hornsey, which was opened a few days ago. The building has cost nearly £14,000, and covers an area of 7,600 square feet. It was erected from designs by Mr. G. Gordon Stanham, and is planned to afford accommodation for 250 scholars. The design of the building is fourteenth-century Gothic.

NEW CHURCH, ALDRINGTON, SUSSEX.—On the 9th inst. the Bishop of Chichester laid the foundation-stone of the new Church of St. Philip, East Aldington. The church will be in the Early English style, and capable of holding 900 persons. The entire edifice will not be completed at first, but when it is finished it will consist of a nave and aisle, with chancel, morning chapel, and two vestries. It will be surmounted by a spire. The architect is Mr. J. Oldrid Scott, while Messrs. Longley & Co., of Crawley, are the contractors.

NEW BUILDING IN ST. ANDREW-SQUARE, EDINBURGH.—The Prudential Assurance Company of London, says the *Scotsman*, has bought the London Hotel, St. Andrew-square, and their architect, Mr. Alfred Waterhouse, R.A., is preparing plans for a new building, to be erected on the site next year.

PARISH HALL, &C., MIDDLESBROUGH.—The foundation-stone of a new parish hall and Sunday-school for the parish of St. Peter's, Middlesbrough, was laid on the 14th inst., by Sir Raylton Dixon. The building consists of two floors. The lower floor will be used as a Sunday-school, and the upper floor as a parish hall to seat about 400. The building is being carried out from the designs of Messrs. R. Lofthouse & Son, architects, Middlesbrough.

*SANITARY AND ENGINEERING NEWS.*

**SANITARY MEASURES FOR HAMBURG.**—According to a recent report of the British Consul-General at Hamburg the continuance of the great work of sanitary organisation occupied the chief place among the important events of the year 1893. The removal of the refuse of the city, the drainage of the waterworks, which have to be pushed on by a ceaseless labour day and night, the previous supply being in quality as bad as it could be, and the outbreak of cholera called for a prompt and radical remedy. The works are divided into two separate portions at the present time, the one in which the refuse is received and allowed to settle, and the filter-beds on to which it flows after treatment at the former. The scale of the work is immense, and nothing that money, science, or skill could effect has been spared. The estimated cost, for 1902, of the construction of the new extension of the works, and when buildings in construction for the Hygienic Institution thereat for the purpose of effectual observation and supervision are completed, this latter amount will be considerably in excess of the cost of the construction of a new and elaborate disinfecting institution, and the disposal of the great quantities of rubbish, was resolved upon early in the year, and the reorganisation of the Hygienic Institution was



concluded. Amongst its many functions is included the supervision of articles of consumption for daily use. Many of the streets have been newly paved with asphalt, dressed stone, and wood, and shortly the present trams, drawn by horses or steam, engines will be replaced by electrical cars. These and other measures have been costly, but a great improvement in the health of the city was manifest throughout 1893, the normal death-rate of 25 and 26 per 1,000 having declined to 16, and not having reached 20 per 1,000 since.

**SEWERAGE OF LONDON, WARWICKSHIRE.**—An inquiry was held at the Public Hall, Erdington, recently, by Colonel Ducat, R.E., with respect to an application made by the Aston Rural Sanitary Authority to the Local Government Board to sanction a loan of 1,150*l.* for extension of sewers within the district. The engineer, Mr. J. E. Wilcox, C.E., of Birmingham, having explained the plans, the Inspector proceeded to make an inspection of the district. There was no opposition to the application.

**SEWERAGE QUESTION AT STAFFORD.**—A Local Government Board inquiry was held on the 2nd inst. at the Guildhall, Stafford, before Colonel Ducat, one of the Inspectors of the Local Government Board, into the application of the Corporation of Stafford for power to raise the sum of 45,000*l.* for the purpose of providing a complete system of sewerage for the borough. In opening the case for the Corporation, the Town Clerk said that Stafford had peculiar physical difficulties, through lying so low in a valley, which had to be overcome. The gradients were so small that all the sewerage would necessarily have to be pumped. He asked that they might be allowed to proceed with the internal sewerage of the town, so as to save time. A number of experiments had been carried out with the sewerage and with slop-closets with the best results. The scheme, which embraces sewerage of the town, erection of refuse destructors and pumping machinery, was then explained by Mr. J. E. Wilcox, of Birmingham, consulting engineer. The Inspector then proceeded to view the works.

**THE NEW RAILWAY INTO LONDON.**—The ceremony of cutting the first sod of the extension of the Manchester, Sheffield, and Lincolnshire Railway Company to London was performed on the 13th inst. at St. John's-wood, by the Countess of Wharfedale. The new line will be about 100 miles in length, and will provide an entirely independent route from Lancashire and Yorkshire to London, placing Chesterfield, Nottingham, Loughborough, Leicester, Lutterworth, Rugby, and other places on the main trunk line, besides providing railway accommodation to extensive districts either at present entirely neglected or inadequately served with such facilities of transit.

#### STAINED GLASS AND DECORATION.

**MEMORIAL WINDOW, CHRIST CHURCH, ASHDOWN FOREST.**—A stained-glass window, consisting of three lights, has just been erected at the west end of Christ Church, Ashdown Forest, to the memory of Mr. Elphinstone Barchard. The subject of the window is Christ blessing little children. The work has been executed by Messrs. Powell & Son, of Whitefriars, London.

**MEMORIAL WINDOW, MOSELEY BAPTIST CHURCH, WORCESTERSHIRE.**—A window has just been placed in the north transept of the Baptist Church, Oxford-road, Moseley, in memory of the late Mr. S. A. Daniell. The work has been carried out by Messrs. John Hardman & Co.

**WINDOW, CONGREGATIONAL CHURCH, TRURO.**—A stained-glass window has been placed in the lecture-hall of the Congregational Church, Truro. The window, supplied by Messrs. T. & W. Farnill, Westminster, and fitted by T. Solomon & Co., of Truro, comprises three lights, the centre portraying Christ blessing little children.

**WINDOW, HOLY TRINITY CHURCH, BESSBOROUGH-GARDENS.**—A stained-glass window has just been unveiled in Holy Trinity Church, Bessborough-gardens, S.W., to the memory of Mr. J. E. Shearman, who was closely connected with the parish for nearly forty years. The subject represented is "The Good Shepherd." The work has been carried out by Messrs. Joseph Chater & Sons, of London.

**WINDOW, ST. MICHAEL'S, BARNES.**—A single-light window in memory of Lady Henrietta Owen was unveiled on the 1st inst. in St. Michael's Church, Barnes. It represents St. Anne, the mother of the Virgin, holding a book and triple crown, and robed in delicate colours, the window being on the north side of the church. The background consists of a screen with jewelled borders, a border in colour also surrounds the whole, the pattern being copies of old glass. Mr. Kitson, the rector, has set to work with great energy towards filling all the windows, this being the eighth executed by the artists, Messrs. Percy Bacon & Brothers.

#### FOREIGN AND COLONIAL.

**FRANCE.**—A committee has been formed to raise a monument at the Cemetery of Montmartre to the memory of Gustave Lévy, the engraver, whose death we recently announced. At the Palace of Versailles some interesting decorative wall-paintings have been discovered under some of the wainscoting—landscapes, flowerpieces, &c. They are, however, in very

bad preservation, and are to be restored. They are supposed to have been carried out under the orders of Marie Antoinette. The authorities at Paris took over officially last Sunday two new pieces of construction: the canon sewage-tube under the Seine at Asnières, constructed under the direction of M. Berlier, engineer; and part of the buildings of the new barrack "des Célestins," built from the plans of M. Jacques Hermant, on the Boulevard Henri IV., near the Pont du Sully. As a complement to the Metropolitan Railway scheme the Paris Municipal Council are considering the prolongation of the Auteuil viaduct to the terminus at Vaugirard. The old hôtel of Mme. Du Barry is being restored, and the quarters of the Syndical Chamber of Jewellery and Silversmiths' work of Paris are to be transferred to that building.

The Académie des Beaux-Arts has elected Mr. R. W. Macbeth a foreign and corresponding member in the section of "Gravure," to fill the vacancy left by the death of a former member. At Rouen last Sunday was inaugurated the monument erected to the memory of Poyeur-Quertier. The monument is the joint work of M. Alphonse Guilloix, sculptor, and M. Jules Adeline, architect; and consists of a pedestal six metres high, on which is a statue of the eminent statesman. At his feet two figures, personifying Agriculture and Industry, are offering him flowers. The design is completed by two bas-reliefs, illustrating the part taken by Poyeur-Quertier in the Treaty of Frankfurt. A Committee of the Senate has approved of the scheme presented by the Government for the improvement of the port of Havre. The jury of the competition for the buildings to be erected at Rouen for the National and Colonial Exhibition in 1896, has awarded the premiums as follows:—First premium, M. Georges Ruel, architect, of Rouen; second premium, M. Armand Lequeux, architect, also of Rouen; third premium, M. Georges Chedanne, architect, of Fontainebleau. The competition was confined to architects born or domiciled in the Department of Seine Inférieure. According to the plan actually deposited at the Mairie of Arras, the area now occupied by the fortifications of that town, which are to be demolished, will be occupied by a length of boulevards of 1,800 metres, 30 metres wide, and 3,700 metres length of fourteen-metre streets. A good many public works are about to be commenced in Algeria, among others a scheme for the construction of a bridge near Constantine, on the Oued-el-Kebir, at an estimated cost of 400,000 fr.—The death is announced of M. Sylvain Pinot, the oldest building contractor in Paris.

**GERMANY.**—The Empress was present at the reconsecration of the Cathedral at Schleswig, which has been restored and added to. The principal addition has been to the West Front, which was left unfinished in the Middle Ages, in the shape of a clock-tower, 13 metres square and 113 metres in height, from designs by Baurath Adler. A large amount of restoration work was done, the paintings being entrusted to Herr Olbers. Several stained glass windows were presented by the Empress and others. Work on the Emperor William monument, in the Schlossfreiheit at Berlin is now being carried on by night and day, with the aid of the electric light.—The debt provided for by 1871 loan indemnity for the building of the new Imperial Houses of Parliament is now closed. The total amount appropriated was, roughly, 1,200,000*l.*, to which must be added 235,000*l.* for interest obtained.—The rebuilding of the Stettin Terminus, at Berlin, is to be taken in hand next spring. There are to be two spans, and the lines are to be raised over 12 ft. without any interruption to traffic. The Municipality has decided to be represented at the 1896 Industrial Exhibition, and has appointed a committee to consider the nature and scope of the proposed exhibits.—The committee for the erection of a monument to the late Grand Duke Ludwig IV. of Hesse has been unable to decide between the rival designs of Professors Eberlein, Schaper, and Von Rumann, and announces a further competition limited to these three sculptors. The monument is to consist of an equestrian statue, to be set up opposite the castle at Darmstadt, and is not to cost more than 7,000*l.*, exclusive of the pedestal.—The castle chapel at Stuttgart, built in 1560 by Duke Christoph, a fine specimen of the Renaissance style, has recently been restored under the direction of Baumeister Bayer.

**NEW RAILWAYS IN ROMANIA AND NAPLES.**—According to some recent Foreign Office Reports, the new railway from Rome to Viterbo, a distance of fifty-four miles, is open for traffic. The trains start from the new station of Trastevere, and the principal places brought into communication with Rome are Bracciano, Vetralla, and Ronciglione, the latter being reached by a branch line starting from Capranza, a distance of five miles. Viterbo is a place which is sure to attract visitors, and the formerly large old town, the population of which is now reduced to 20,000, will reap some benefit for its trade by easier and more rapid means of access from and to the capital. Some other interesting places from an artistic point of view, such as Caprarola and Toscanella, are also rendered more accessible, and archaeologists will be able to get much more easily to the ruins of ancient Veii by going to the station of La Storta, 12½ miles

from Rome.—The necessary plans have been prepared for an ordinary narrow-gauge railway between Civita Vecchia and Tolla, possibly with the intention of extending the line to Bracciano, but for the present the matter is left in abeyance, although both the municipalities interested and the provincial authorities have agreed to contribute towards its construction.—The works of the line "Baretta Spinazzola," in the district of Naples, are proceeding regularly, and it is expected that they will be completed early next year.—Owing to measures of economy forced on the Government by the financial crisis, neither the railway from Salerno to Sanseverino, nor the coast line from Battipaglia to Reggio have progressed much, but an important road joining the coast of Amalfi to that of Sorrento will shortly be completed.

#### MISCELLANEOUS.

**WICKHAM HALL, KENT.**—In reference to this house, the additions to which were illustrated in our last issue, Mr. Walter Millard, the architect, writes to say that he should have included in the list of firms employed on the work the name of Messrs. Arrowsmith, whose solid parquetry is employed for hygienic purposes on the floors.

**LAUNDRY AND SANITARY EXHIBITION.**—The second annual Laundry and Sanitary Exhibition was opened at the Agricultural Hall, Islington, on the 7th inst., and will close to-day (Saturday). Like the previous exhibition, the present one comprises machinery and utensils of all kinds connected with the laundry-trade, but few exhibits that can have more than a general interest. The most noteworthy exhibit is the Blackman Ventilating Co. again practically demonstrate their system of rapid drying by means of two hot-air chambers side by side, but this has previously been described in our pages, and the same remark applies to Messrs. Doulton & Co.'s large exhibit of water-softerening apparatus. Messrs. John Gibbs & Sons, of Liverpool, show, at Stand 159, their patent automatic rain-water repurifier, an ingenious arrangement for collecting rain-water from roofs, while allowing the first-washings therefrom to escape—an improved ventilating-inlet shaft for the admission of fresh air without draught, and for allowing the air to be screened or disinfected, and air-propelling and ventilation fan, provided with four blades. The Eagle Range and Foundry Co., of Regent-street, have, at Stand 47, a large exhibit of their ranges, &c.; and Messrs. Twyford, of Hanley, show their enamelled fire-clay hospital sinks, &c. Among other firms who are represented, but whose exhibits do not call for special mention, are Messrs. Straker Whitworth, & Co., of Cannon-street, who show Andrew Hovatt's water-softerener; Messrs. Meldrum Bros., Manchester, with the "Meldrum furnace, for burning practically all kinds of fuel and for improving defective draught; the "We Soften Water" Syndicate, Ltd., of London; the Mechanical Inventions Syndicate, Ltd., of London; Messrs. James Stott & Co., who show their "chimney-breast exhauster," &c.; and Mr. A. T. Cooper, of London, who exhibits his patent suction and vacuum-pump.

**GLASGOW BUILDING TRADES EXCHANGE.**—The first annual general meeting of the shareholders and subscribers of the Glasgow Building Trades Exchange was held in the Exchange Rooms on the 29th ult., Colonel Bennett presiding. Mr. Cook, secretary, read the report, which showed that the balance at the close of the association on September 30, was 611*l.* 8s. 4d. There were 63 shareholders holding 244 shares and 153 subscribers on the roll; 13 approved applicants were now waiting for admission. The arbitration committee had only once been called upon to act. Twenty-eight exhibitors have rented space in the rooms, representing an annual rental of 130*l.* Mr. Laird moved the adoption of the report, and Mr. McGilivray, in seconding, claimed that the plasterers' labourers' strike was now at an end, and that the victory which the masters had achieved was due in great part to their connexion with the Exchange.

**SANITARY INSPECTORS' ASSOCIATION.**—In connexion with the course of lectures and demonstrations arranged by the Sanitary Inspectors' Association for sanitary officers, Professor Vivian B. Lewes, F.C.S., F.I.C., delivered the last of a series of five lectures on "Combustion, and the influence of its Products on Health," at St. James's Hall, Piccadilly, on Monday evening. Mr. Young, of Battersea, presided. Professor Lewes, whose lecture was entitled "Smoke: its Production and Prevention," said the use of fire for heating purposes, and the consequent smoke, was a great cause of the air currents, and that it was more than if there were no means of removing it, the air would soon become perfectly opaque from its accumulation in large quantities. When, however, rain fell, it rapidly washed the air free from the suspended solid and liquid impurities which constituted the visible portion of smoke. Snow was even more efficacious than rain in doing this, and where the snow had fallen on the glass roof of a greenhouse, it was noticed that when it melted it left behind a black deposit consisting of the solid matter which it



and collected in its passage through the air, cases where long drought prevented the rapid escape of the air by this means, the heavier of the solid particles settled by gravity, whilst the particles of carbon and carbonaceous organic matter were slowly oxidised by the oxygen and ozone into carbon dioxide, in which form the vegetation removed them from the air. The Professor dealt at some length with the formation of fog, and referred to the fact that the gaseous impurities ordinarily found in the atmosphere increased in several methods by which it had been proposed to prevent smoke, he observed that the adoption of nitrate as a fuel would undoubtedly reduce the smoke to a practical minimum, but it would be necessary to adopt new forms of stove in order to create the necessary draught for its consumption. The idea of consuming smoke by afterwards passing it over heated surfaces did not, as a rule, he contended, fulfil the expectations which were at one time formed for it. There was no doubt that the great solution of the smoke trouble would come from the universal employment of gaseous fuel; in fact, the advantages to be gained in the condition of the atmosphere by an extended use of gaseous fuel were many. Many proposals had been made for the filtration and washing of smoke, but in any such scheme the dilution of the substances they desired to get rid of by enormous volumes of air would introduce practical difficulties as great as those which dilution by water had introduced in the sewage question, and he did not think a solution of the trouble would be found in that direction. In conclusion, he thought their best chance of a "smokeless city" was to be found in the intelligent consumption for fuel purposes of the chief products of their gasworks—coal-gas, and coke. A hearty vote of thanks was afterwards accorded to the lecturer, on the motion of Mr. Alexander, seconded by Mr. Tidman, and supported by Mr. Des. The following is the text of the LECTURE ON THE NORTH-WESTERN HOSPITAL, LONDON.—At a meeting of the managers of the Metropolitan Asylums District, held in the hall of the London County Council, Spring Gardens, on the 10th inst., Sir Edward Galsworthy, Chairman of the Board, presiding, the Committee of the North-Western Hospital reported that as the Board had decided to establish an installation of electric light in that hospital, they had consulted Professor Ayrton on the best method of doing so. His opinion was that where the number of lights required is only about 800 or 900, it is better and more economical to obtain the energy required from some large central station, provided the current can be obtained at 5d. or less per unit of electricity. The number of lights required at this hospital will be about 800, and the whole Professor Ayrton is strongly in favour of the managers obtaining their supply from the Hampstead Vestry. The committee therefore recommended that the action of the committee in having engaged the services of Professor Ayrton to prepare a report on the question of lighting the North-Western Hospital by electricity, to prepare a specification for wiring the hospital, and to supervise the work, be approved and confirmed; and that the offer of the Hampstead Vestry to supply electrical energy to the North-Western Hospital be accepted, the agreement in the matter to last for three years certain.—The report was agreed to.

**SANITARY LECTURES.** The second of the course of lectures on the Sanitation of Industries and Occupation, which is being given at the Sanitary Institute, 74A, Margaret-street, was delivered on the 8th inst. by Mr. C. le Neve Foster, D.Sc., B.A., F.R.S., H.M. Inspector of Mines, Prof. of Mining, Royal College of Mining, Llandudno, the title of whose address was "On Quarrying of Various Kinds—Granite, Marble, Stone, Slate, Chalk, and Limestone." Professor W. H. Corfield, M.A., M.D., occupied the chair. The lecturer began by giving several definitions of quarries, and remarked that they varied in different countries. He insisted upon the necessity of bearing this in mind when making comparisons between British and foreign statistics. He pointed out that in addition to stone, many metallic ores, gems, and even fossil fuel are obtained from workings open to the sky. The processes in use for "getting" minerals by hand and by machinery were described briefly, and a few words were said about fire setting and the hydraulic methods of working mineral deposits. Actual examples of quarries in different countries were required at some length, and then the lecturer passed on to methods of transport and the preparation for the market. The commonest accidents to which quarrymen are liable were mentioned, and a few words were said about diseases, but the lecturer was of opinion that the question of diseases was scarcely ripe for discussion. In his opinion it required a more extensive investigation in the principal quarrying localities. In conclusion, he pointed out the effect of the new Quarries Act which comes into force upon January 1 next. The lecture was illustrated by more than sixty lantern-slides, most of which had been specially prepared for the occasion.—The *Quarterly Journal of the Sanitary Institute* for October contains the principal papers and the minutes delivered at the Sanitary Congress at Liverpool, to which we devoted a good deal of space at the time, but could not of course give all the papers in full. The discussions, however, are not included in the journal.

**GAS-FIRES.**—Messrs. R. & A. Main send us an advertising circular in favour of the employment of gas-fires in hotels, as a saving of expense and labour, with illustrations of their gas-fires and the method of fixing them. In the advantage of the employment of this form of fire for hotel bedrooms we entirely concur, though we are not sure that its greatest usefulness would be realised by a system which keeps the key and power of turning on the fire in the hands of the hotel staff exclusively. The convenience of a gas-fire would be that the occupant of a bedroom could light it for a few minutes (even) when wanted, without the trouble of summoning servants and giving a regular order. A small meter would show the amount to be charged for it. There seems no reason why the customers at a hotel should not have the control of a gas-fire as much as of the gas or electric light.

**ARCHAEOLOGICAL FIND, LLANDRINDOD CHURCH.**—A find of undoubted archaeological value, says the *Western Mail*, was made at Llandrindod on the 1st inst., in the course of the demolition, for purposes of restoration, of the north wall of the ancient parish church of Llandrindod. While dislodging the stones of the wall in the interior of the church, a workman found on the level of the floor, embedded face downwards, what proved to be a stone rudely carved in bas-relief. The figure was that of a nude woman. The stone was lodged in the wall as an ordinary one would be, the only striking outward mark being visible after the encrusting lime-wash had been removed. This mark was a rudely-chiselled cross, and it is thought was made upon the stone at the time it was placed in the church wall, so that it might be recognised.

**THE DEVON VOLUNTEER MEMORIAL, EXETER R.**—On the 26th ult. the Devon Volunteer Memorial Committee held a meeting at the Exeter Guildhall, under the presidency of the Right Worshipful the Mayor (Mr. Alderman Domville), for the purpose of meeting the author of the selected design (Mr. S. Greenslade), and settling details in connexion with the carrying out of the work. A letter was received from the Town Clerk intimating that the City Council approved of the design selected for the memorial, and assented to its being placed on the terrace on Northworthy, subject to the foundation being laid under the City Surveyor's direction. A draft contract with Messrs. Hems & Son was submitted and approved of. It was resolved that the memorial should include a bust in high relief of Sir John Bucknill. This will be placed in the panel overlooking Northworthy. The panel on the reverse side will bear an inscription, and a third panel will contain the names of the Committee of 1832 and the first officers commissioned by the Queen, including Major Rodway, of Torquay. In the fourth panel will be placed the names of the towns of the county of Devon which supplied Volunteers to the 1st R.V. on its formation.

**RESTORATION OF THE BRISTOL CIVIC CROSS.**—The ancient High Cross, which for so many centuries was one of the architectural features of old Bristol, is, says the *Bristol Mercury*, being most carefully restored. The date of its erection is generally accepted as A.D. 1373. It is made entirely of box-ground Bath-stone, which was originally coloured in blue, gold, and vermilion. It was first put up in Bristol at the intersection of the four most important streets in the city near the old Tolsey—Winc-street, High-street, Broad-street, and Corn-street—to commemorate a charter granted to the burgesses by King Edward III., and it had upon it statues representing the following Kings—John, Henry III., Edward I., and Edward III. Later on, in 1633, it was raised and four more statues added, namely, Henry VI., Elizabeth, James, and Charles I. In 1723 it was taken down and reconstructed in the centre of College-green. But thirty years later it was again pulled down on the plea that it was an obstruction to the thoroughfare. The stones were then deposited in a corner of the cathedral, and lay there uncarved for and almost forgotten until 1766, when Dean Barton gave them to Sir Richard Colt Hoare, rebuilt, stone for stone, in his park at a cost, it is recorded, of 300*l*. The present cross in College Green is a facsimile of its predecessor; it was erected in 1851 at a cost of 450*l*., but all the niches were left vacant. Five years later, however, the Freeman's of the province presented the statue of Edward III., by Thomas, the original sculptor of the statues on the Houses of Parliament. The cross stood on the spot where the statue of the Queen now stands, and there it remained for thirty-seven years, i.e., until in 1888, when it was removed to its present position. Messrs. Harry Hems & Sons, of Exeter, were then commissioned to fill the remaining niches with statues precluded by the original statue, and they having made plaster casts of the latter, the work was carried out. The cross at Stourhead has latterly got into such a dilapidated state that fears have been entertained for its safety—so much so, indeed, that Sir Henry Hoare commissioned Mr. C. E. Ponting, F.S.A., of Lockeridge, Marlborough, the Architect and Diocesan Surveyor for Wilts, to make a professional examination of it. In a report thereon Mr. Ponting attributed the present dangerous state of the cross not so much to the decay of the Bath stone as to the free use of iron dowels, cramps, &c., in its reconstruction in the last century. The expansion of the metal by oxidation has since split and burst the

stonework in all directions, and he was of opinion that unless prompt measures were taken for its preservation, the cross would fall down of its own accord, and at a very early date too. The result of this report has been that Messrs. Harry Hems & Sons have been entrusted with the task of renovating the cross, at an estimated cost of about 500*l*.

**HANOVER CHAPEL, REGENT-STREET.**—At the laying of the foundation-stone of St. Anselm's, Davies-street, last week, the Duke of Westminster, who has given a site for the church and vicarage, made a speech that in effect sounded the knell of Cockerell's church in Regent-street, long known as Hanover Chapel, which is to be pulled down as soon as St. Anselm's is completed, and the proceeds will be devoted to the cost and endowment of the latter. The contract of Messrs. Walter Holt & Sons, Croydon, for 20,000*l*., for the new church and vicarage was accepted. A print, after J. H. Shepherd, of Hanover Chapel, was published in 1827, in "Metropolitan Improvements."

**LEGAL.**

**NUISANCE ON ACCOUNT OF VIBRATION IN MANCHESTER-STREET, W.**

THE case of Wise and others v. the Metropolitan Electric Supply Company came before Mr. Justice Stirling in the Chancery Division on the 16th inst. The facts of the case are shortly as follows:—The plaintiffs last April obtained an injunction restraining the defendants from carrying on their works at Manchester-street, W., in such a manner as to cause a nuisance to the plaintiffs by vibration, the operation of which injunction was, however, suspended until September 5. At the hearing of the action for an injunction it was proved that vibration did exist to a considerable extent, but owing to the nature of the soil upon which the defendant's works are erected the task of preventing it from being communicated to the surrounding houses presented very great engineering difficulties. At the time the injunction was granted the defendants under the advice of several eminent engineers were endeavouring to overcome the difficulty by works intended to increase the rigidity of the bed or platform upon which the engines were rested, but their efforts appeared to be only partially successful, as the defendants had, since the granting of the injunction, determined to substitute for the reciprocating engines hitherto in use a new class of engines known as steam turbines, which can be used, it is alleged, without causing any vibration. The defendants accordingly have removed some of their old engines to one of their other stations, and have erected one turbine and ordered two others, which when in use will, it is hoped, enable them to supply all the necessary electric energy without having recourse to the old class of engines. The plaintiffs, however, alleged that the defendants, notwithstanding the injunction, had allowed the nuisance to continue, and moved for leave to issue a writ of sequestration against the defendants.

After hearing the evidence, his Lordship asked if the defendants were willing to undertake not to use more than one reciprocating engine, besides the turbines, for a period of three weeks. The defendants consenting to this proposition, his Lordship said it appeared to him from the evidence that if the defendants worked three engines of the reciprocating class a nuisance would be caused, but if they only used one there would be no such vibration as to amount to a breach of the injunction. As he was anxious to be satisfied by a further experiment, that was so he should direct the motion to stand on for three weeks upon the undertaking of the defendants which had been already given.

Mr. Graham Hastings, Q.C., and Mr. Beaumont appeared as counsel for the plaintiffs; and Mr. Vernon Smith and Mr. Waggett for the defendants.

**MEETINGS.**

**FRIDAY, NOVEMBER 16.**

*Institution of Civil Engineers (Students' Meeting).*—Mr. John F. C. Snell on "The Economics of Direct-Current Central Stations." 8 p.m.

*Institution of Junior Engineers.* Inaugural Meeting of Fourteenth Session. Presidential Address by Mr. Alexander Siemens. 8 p.m.

*Sanitary Institute (Lectures for Sanitary Officers).*—Mr. Charles Mason on "Scavenging, Disposal of House Refuse." 8 p.m.

**SATURDAY, NOVEMBER 17.**

*Institution of Junior Engineers.*—Visit to the Globe 1500 Printing-office and Linotype Machine Installation, 367, Strand. 2.30 p.m.

*Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).*—Inspection of the Southwark and Vauxhall Waterworks, Hampton. 3 p.m.

**MONDAY, NOVEMBER 19.**

*Royal Institute of British Architects.*—Paper by Mr. Frederick M. Gratton entitled, "Notes upon the Architecture of China." 8 p.m.

*Sanitary Institute (Lectures for Sanitary Officers).*—Professor A. Wynter Blyth on "Diseases of Animals in Relation to Meat Supply; Characteristics of Vegetables, Fruit, &c., unfit for food." 8 p.m.

*Glasgow Philosophical Society (Architectural Section).*—Presidential address by Mr. T. L. Watson.

**TUESDAY, NOVEMBER 20.**

*Institution of Civil Engineers.*—Mr. Albert J. Durston on "The Machinery of War-Ships." 8 p.m.









**MILTON** (Derbyshire).—For sinking and boring operation and developing and proving the yield of water at a site at Milton, near Derbyshire, in connection with the Swadcliffe and Ashby-de-la-Zouch Joint Waterworks. Mr. George Hodson, Engineer.  
Contract No. 1.  
Ninian Borng, & Co. £5,211 2 6  
Thomas Tuley & Co. 4,551 0 0  
H. Sharpley 4,175 0 0  
J. F. Pnce 3,455 0 0  
Accepted.

**PENARTH** (Wales).—For relaying a portion of 12 in. pipe sewer, Salop-street, for the Local Board. Mr. Edgar J. Evans, Surveyor, Local Board Offices, Penarth.  
Escott & Ford £198 10 11  
W. R. Thorne 154 0 10  
Thomas Rees 152 17 0  
Frank Ashby 142 9 8  
Gardner & Hagger 142 4 6  
John Jones 135 11 0  
Bachelard & Snow 133 7 0  
Accepted.

**PENARTH**—For the execution of private improvement works, Archer-road, for the Local Board. Mr. Edgar J. Evans, C.E., Surveyor, Local Board Offices, Penarth.  
Gardner & Hagger £1,614 11 11  
Thomas Rees 907 1 1  
Frank Ashby 893 1 9  
John Jones 821 4 6  
Richard Smith 817 18 1  
Accepted.

**PONTYFRID**—For the erection of a church close to Tyllyn-station, Mr. Geo. E. Halliday, architect, 14, High-street, Cardiff. Quotations by Mr. John W. Edgar, surveyor, Cardiff.  
N. Shirds £1,612 10 0  
Davies & Sons 2,605 12 1  
Williams & James 2,570 10 0  
Accepted.

**SOUTHAMPTON**—For additions, &c., to Oddfellows' Hall, St. Mary's-street. Mr. Jno. H. Blizard, architect, Castle-street, Southampton.  
W. H. Neale £249 19 6  
G. Bagshaw 229 19 6  
H. Harris 225 10 0  
Kierstead 201 15 2  
Accepted.

**SOUTHPORT**—For the supply of 10 yds. of artificial flag, for the Corporation. Mr. W. Culltre, Borough Surveyor, Southport.  
Croft Granite Concrete Co. 5 d.  
Patent Victoria Stone Co. 5 0  
W. Garstin & Son 4 11  
Shay Granite Co. 4 2  
Accepted.

**THREKELD** (Wales).—For laying 12 in. granite channelling, &c., for the Local Board.  
W. Wadley 1 7 per yard super.  
T. Adams 0 10  
S. Kavanagh 0 9  
Lee & Son 0 7  
W. Adamson 0 7  
Accepted.

**TONYREFAIL** (Wales).—For the erection of school buildings, for the Local Board. Mr. J. J. Evans, C.E., architect, Tynyrefail.  
J. S. Thomas £3,330  
Edwin Williams 3,140  
Elias Thomas & Lewis 3,140  
Chas. Jenkins & Son 2,900  
C. H. Cookley 2,880  
Accepted.

**WARRINGTON**—For the execution of street works, Monk's-street, for the Corporation. Mr. Theo. Longdon, Borough Surveyor, Warrington.  
Wm. Prescott £148 11 11  
F. T. Bennie, War. 291 0 0  
Wm. Heaton 291 0 0  
Accepted.

## TO CORRESPONDENTS.

J. W. B.—F. W. amount should have been stated.  
We are compelled to decline pointing out books and giving addresses.  
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# The Builder.

VOL. LXVII, NO 2731

NOVEMBER 21, 1894.

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The Bishopsgate Institute: Principal Entrance Front.—Mr. C. Harrison Townsend, F.R.I.B.A., Architect .....	Double-Page Ink-Photo.
The Bishopsgate Institute: Section and Plans.—Mr. C. Harrison Townsend, F.R.I.B.A., Architect .....	Double-Page Photo-Litho.
New Nave and Tower, St. Peter's, Bushey Heath.—Mr. Jas. Neale, F.R.I.B.A., Architect .....	Single-Page Photo-Litho.
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## Mineral Statistics.



IN spite of official, semi-official, and rumoured promises of improvement; in defiance of questions asked in the House and answered with a craftiness as subtle as comfort for the time being; and in face of the utterly unreliable figures and unbusinesslike manner in which certain portions of it have hitherto been presented for public delectation, the "Mineral Statistics for 1893" \* has appeared in the same form and with the same faults as its predecessors. In criticising the statistics relating to 1892 we called attention† to the absurd method of computing the quantity and value of stone returned from quarries all over the kingdom from the number of men employed as quarrymen, or, at least, who styled themselves as such in the census returns. We find the same ridiculous error perpetuated in the returns now under review, only that instead of being based on that of 1881 they are now calculated from the 1891 census. There is this difference also, that in the present returns the number of "stone merchants" is omitted; the Home Office has evidently come to the conclusion that the 3,000 odd stone-merchants in the United Kingdom are not in future to be regarded as "stone-producers"; yet many of these are stonemasons working in the quarry.

Taking the figures as they stand, we observe that the total value of stone raised in the United Kingdom in 1893 was £773,743*l.*, as against 8,667,736*l.* in 1892. Slates and slabs raised were valued at £2,025,922*l.* in 1892 and at 1,107,626*l.* in 1893, thus showing a considerable improvement. Adding the values of stone and slate together, we find that they represent about one-eighth of the total mineral produce of the country; or, excluding coal, almost two-thirds of the total produce, as the compilers still include gannister, shale, sand, yellow clay, calc spar, &c., and other miscellaneous items, in the

general result, it is impossible to ascertain how much stone was raised exclusively for building purposes. But by a species of analysis we are enabled to see that the quantity of Bath stone raised during the year from mines alone was 115,421 tons. Comparatively few Gloucestershire quarries are stone mines, and only 980 tons are recorded; 11,637 tons are credited to Swanage and Beer. It is impossible to arrive at the output of Yorkshire, or quarries in other counties, from any particulars given in the return. We notice that several which ought to be included under the Metalliferous Mines Act, and thus find their place amongst these statistics, are, for some inexplicable reason, omitted.

Turning to the production of slate and slate slabs, it is noteworthy that the slate mines in England and Wales only gave 145,951 tons, as against 293,042 tons from open works; but whereas the former fetched 47*l.* 15*s.* 4*d.*, and the latter only 63*s.* 6*d.*, it is evident that slates obtained from the mines were as a whole much more valuable than those from open works. The quantity and value of roofing slates exported during the year was 38,739,100, valued at 203,729*l.*, as against 48,702,700, valued at 264,985*l.*, in the previous year.

Gypsum occurs in the counties of Cumberland, Derby, Nottingham, Stafford, and Westmoreland (in rocks of Triassic age), and in Purbeckian beds at Battle in Sussex. The total amount raised in 1893 was 143,486 tons, valued at 59,369*l.*, as against 147,540 tons at 58,227*l.* in the previous year. Here, again, the Report is not as explicit as it might be. Gypsum is raised principally for the manufacture of plaster of Paris, but the amount used annually also in the preparation of Keene's and Parian cement and as alabaster "marble" is very large. It might not be easy to separate the quantities used for plaster and cement respectively, but surely it is not too much to ask that that used as marble shall be dealt with in a different form. As the return at present stands, it is impossible to ascertain what particular product is responsible for the reduction in quantity in last year's output. It is noteworthy that the gypsum raised in Cumberland and Westmoreland is not valued at such a high price as in the other counties mentioned.

The official method of dealing with clays is to separate those used in the manufacture

of certain pottery and all china-ware, and fire-clay and fullers' earth, from those dug for brick-making and the like. The figures relating to the last-mentioned portions, as already stated, are submerged in the middle headed "Stone, &c." Glancing at the statistics relating to the remainder, we note that the compilers could easily have furnished separate items for china-clay, pottery-clay, fire-clay, and fullers' earth respectively, but that they have elected to mix all these products together in the general totals in such a way as to entail considerable trouble in understanding them. These totals show that during 1893 3,065,208 tons, valued at 847,419*l.*, were raised, as against 3,103,852 tons, at 889,375*l.*, in the previous year. Of this we estimate that about 2,370,000 tons, valued at 430,000*l.*, relate to fire-clays in 1893, thus showing the greater comparative value of the clays used for other purposes mentioned. The term "pottery" is a difficult one to comprehend in the light of the present method of putting the figures. If one restricts it to the ware made from the white and greyish clay as raised in Devon or Dorset, as is done apparently in the returns before us, a totally erroneous idea is imparted. We prefer, therefore, to leave that item to take care of itself. No attempt is made to separate china-clay from china-stone, to which we have no special objection; but the total production of these two commodities is rendered unintelligible by the inclusion of "&c."—whatever that might refer to in this case. What has become of the "china-stone" raised in such large quantities near Holyhead, in Anglesey? Surely the industry has not died out; we saw it in full working-order only a few years since. Are we to understand, also, that none of these clay products are obtained from open works in Ireland?

The quantity of "ochre, umber, &c.," raised in 1893, was 10,534 tons, valued at 13,880*l.*; in the previous year 12,131 tons at 16,782*l.* were returned. The greater part of this was obtained from open works in the counties of Devon, Gloucester, and Somerset, but nearly one-fourth of the total production was raised from mines in Anglesey and Somersetshire. The return states that a considerable amount of ochre is deposited by the ferruginous water from copper precipitation pits, when exposed to the action of the atmosphere in shallow ponds.

The statistics relating to arsenic refer to

\* "Mineral Statistics of the United Kingdom, &c., for the Year 1893." Prepared by Her Majesty's Inspectors of Mines. London. 1894.

The Builder, December 9, 1893, p. 426.

arsenic acid, or white oxide of arsenic (crude and refined); much of it is a by-product obtained in preparing the tin and copper ores of Cornwall and Devon, 5,976 tons, valued at 57,694*l.*, were returned for 1893. Arsenical pyrite is sold to works principally in the two counties last mentioned, for the manufacture of white arsenic. The quantity obtained in 1893 was 3,036 tons, valued at 2,948*l.*

Flour spar is found in the counties of Cornwall, Derby, and Durham. It is used as a species of polished "marble," especially in Derbyshire, but is also employed as a flux in various metallurgical operations, and in the manufacture of hydrofluoric acid. In 1893, 215 tons, valued at 161*l.*, were returned. Here, again, the compilers might have indicated the proportion made into "Blue John" goods.

The various other minerals raised are not of special interest to us, and need not, therefore, be noted.

The production of minerals and certain metals in the British colonies and possessions is referred to in an appendix. We observe from this that in 1892 no fewer than 280,053 tons of stone, dressed and in the rough, valued at 164,835*l.*, are credited to Guernsey and Jersey, though how much appertains to each island does not appear. The figures mostly refer, of course, to road-metal and the like from St. Sampson's. There seems to have been some slight increase in the trade, for in 1891 the stone exported only amounted to 131,088*l.* The circumstance that a work published well into 1894, and referring to 1893, should not be able to give any later statistics in regard to the Channel Islands' trade than those relating to 1892 (which statistics, we note, are taken from the "Annual Statistics of Trade of the United Kingdom for 1892"), is a striking commentary on the influence of "red-tape." The authorities in Guernsey, as we know from experience, would be glad to supply the information up-to-date gratuitously, on the expenditure of a penny postage-stamp and the trouble of writing a letter.

They seem to take considerable care in Ceylon in compiling mineral statistics relating to the island. For instance, the blocks of "Cabook" building-stone have actually been counted; they number 3,372,500, and were valued at 9,358*l.*, in 1892. The number of "cubes" of granite raised in the same year came to 7,033, and were valued at 3,165*l.* We wonder that the excellent manner of setting forth the products of Queensland should be retained in the Home Office publication before us. We read that during 1892 60 ozs. of marble, 1,600 ozs. of sandstone, and, so many ozs. of bluestone, freestone, limestone, and porphyry were raised; when we see that marble in Queensland, according to this official return, is valued at 2*l.* per oz., and that freestone fetches more than 3*s.* per oz., we begin to get some idea of the cost of building in the colony. (!) The Home Office is evidently jealous of the superiority of the methods adopted by the compilers of the mineral statistics of Canada. That colony, like the United States, publishes figures which may be comprehended at a glance; thus the quantity and value of bricks, cement, grindstones, tiles, &c., are given in the Canadian annual returns. This proved too much for the authorities at Whitehall, who note that "In order to make the Canadian statistics agree with the system adopted in other Colonies these products are omitted"—i.e., in the publication before us. If they are to be excluded because they are manufactured products, let that system pervade the whole of the returns. Slate slabs, for instance, are as much manufactured articles as are bricks, tiles, and many other things we could point out in the return under review. Adopting the method pursued with reference to Canada, these manufactured products ought not to appear in the mineral statistics of the United Kingdom. We note that *purified* asphalt from Trinidad to the extent of 9,409 tons,

valued at 18,818*l.* in 1892, is included; the raw asphalt, 102,816 tons, was valued at 102,813*l.* in the same year.

We have no desire, however, to continue the criticism; more than enough has already been said to show that before our annual "Mineral Statistics" can be of any real use, they will have to be presented in a totally different manner, in much more minute detail, and more carefully edited. We know perfectly well that certain particulars are not permitted to be given by Act of Parliament; we know also that in some cases it is not compulsory on producers to furnish the authorities with figures as to quantity and value of minerals raised. But, leaving these difficulties out of the question, and speaking only with reference to what statistics are available and may be published, we have no hesitation in saying that they are, for the most part, given in the worst form it is possible to devise, and in certain cases, apparently, with the deliberate desire to confuse the reader. Finally, let us remind the Home Office that "coal" and "iron" are no more deserving of selection for special attention than the other minerals mentioned in the Report; a work professing to give an account of the value and quantity of all minerals raised in this, or any other country, should deal with each mineral impartially.

#### HISTORY OF PAINTED GLASS.

MR. WESTLAKE has at last concluded, by the issue of the fourth volume, the excellent history\* of the art of stained glass to which he has long devoted himself. We use the expression "stained glass," which has come by association and long use to have a kind of special and picturesque signification, and which, moreover, appears to us the more correct one; and we do not see why Mr. Westlake prefers the expression "painted glass," which has not been consecrated by usage, and which is so far from being true in fact that, although there is painting on glass, in the detail of even the best periods of work, it is nevertheless true that in a general way the less painting there is the better is the work, and that which is entirely and literally painted glass is exactly what those who best understand the art wish to see the least of. Why then adopt the term "painted glass?"

Mr. Westlake's book is, however, as he carefully discriminates on the title-page, not a history of painted glass, but "of design in painted glass"; it is the artist rather than the material that we are concerned with, though we have to consider the design as influenced by or suited to the materials.

Mr. Westlake's new volume brings us to the Renaissance period, and the transition from Mediaeval to Renaissance design, which did not happen all at once, nor entirely *pari passu* with the change in architectural style. This was natural enough in the case of an artistic medium which is so stubborn as stained glass, so much hampered by technical conditions. A new habit of treatment could not be evolved at once for such a material. The most marked characteristic, Mr. Westlake observes, of early sixteenth-century design, in certain instances, was the abandonment of canopies, which the author suggests may have been due to an invasion of realistic feeling—"Abel was not killed in a centre of canopy work," &c. It is hardly necessary, however, to imagine so philosophical a motive. The constant tendency to change, to try new experiments in style, in the Mediaeval period, is quite sufficient to account for the abandonment of a form of detail which had been worked for some time, and presented no further capability of development. As the author truly observes, however, a decorative framework between the figure and the margin of the window is a desirable element

in stained glass design, and where nothing was substituted for the canopy the result was a loss. Another characteristic of the period which is noted is the comparative abandonment of outline as a means of delineating the figure, at least as the main means, and the use of more elaborate modelling and shadowing; in so doing running the risk of destroying one of the greatest beauties of the material—its translucence—and substituting, in many portions of the work at all events, an opaque surface-colour, which would decay and peel off in time, for a translucent tint embodied in the glass. On the other hand, one is rather surprised to find the author, a page or two further on, getting enthusiastic over the beautiful effects to be got with enamel colours, and wishing, now that domestic glass is coming in, that some specialist would take up and revive this class of work. We cannot much sympathise with this wish. The true art of stained glass lies in translucent coloured glass, not in painting in semi-transparent colours on white glass; and one may just as well have the true art in the house as in the church.

Among the most interesting of the designs of which illustrations are given in the book are those from the Chapel of the Holy Ghost at Basingstoke. These designs have been ascribed both to Flemish and to French artists; Mr. Westlake is of opinion that they are probably by English artists. Both Lord Sandys and Bishop Fox, he states, were interested in the Basingstoke chapel. "Bishop Fox had entrusted such important works as those at King's College, Cambridge, to the King's glassers, Flower & Hone, of Southwark (the latter of whom did the Hampton Court work); it seems to me, therefore, hardly probable that he would have gone abroad for that in the chapel at Basingstoke." Fig. 1 shows a canopy from the chapel, which is an interesting example of Gothic feeling in work of this kind, carried out with Classic details. The three-centred arch in the lower part of the composition though not pointed, seems like a survival of the Tudor form of arch; and the pinnacles above have a decided Gothic appearance, though the detail is mainly Classical—not entirely so, for it will be observed that the pointed ogee arch occurs on the front of the pinnacles. The figure of St. Peter (fig. 2) from a window in the same chapel, with its fine and expressive head, is much less Mediaeval in appearance; but if there were any foreign influence in it, it suggests Italy rather than France or Belgium. As in fig. 1, the lead lines are very boldly and freely treated, and not on any fixed system as to following the lines of the design, though they are more consistently treated in this respect than in fig. 1, where, as will be observed, some of the leads follow the lines of the design (rather roughly), while the lower horizontal bar entirely ignores the design, and cuts straight through the arch. Fig. 3 is a piece of ornament from the same chapel at Basingstoke; and here, in spite of the symmetrical character of the design, a great deal of the Mediaeval element is perceptible; indeed it would be almost difficult to decide, from the style of the design, whether this had come out of a Renaissance or a Late Mediaeval window.

As to the interesting question—Who were the real designers of these and other windows of the period?—Mr. Westlake has something to say, but only in a doubtful and suggestive manner. Certain artists are mentioned in deeds relating to various windows, and it is presumed that they at least executed the cartoons, but which design each was to do the author admits is a somewhat fruitless inquiry, without more evidence on the subject than we can ever get now. He adds, "that the contractors for the windows had not great scruples, nor a great sense of artistic proprieties, is shown by the circumstance that the character of the Messengers and their canopies is often discordant", both with each other and with the accompanying sub-

\* "A History of Design in Painted Glass. By N. H. J. Westlake, F.S.A. Vol. IV. James Parker & Co., London and Oxford, 1894."

\* This is in reference to the King's College windows especially.





Fig. 1. A Canopy from the Holy Ghost Chapel, Basingstoke.



Fig. 2.—St. Peter, from the Agony in the Garden, in the Holy Ghost Chapel, Basingstoke.

ects and ornament surrounding it, and are frequently repeated; for example, those in the centre light of the seventh window on the north side are discordant with the subjects flanking them, which contain figures and ornaments with earlier *motifs*. In short, it seems not unlikely that the carrying out of stained-glass windows was at the period in question as much a business affair as in too many cases it is now; a subject on which we may have more to say in a future number. Elsewhere Mr. Westlake observes, "my own ideas are decidedly that the glazier was the composer, and even the inventor, of some of the best ancient examples; generally speaking, he had to supply the 'vidimus' or cartoon, but in the decline of Art he may have been merely a copyist and ultimately a contractor." The same subject is touched upon in the course of the chapter on the late stained-glass of France, in reference to certain windows by Laurence Fauconnier in the Church of St. Bonnet at Bourges, who is also supposed to have done the windows at the Château d'Ecouen of the same date, 1544; a date which is inscribed, with the artist's initials, on a shield in one of the windows at Bourges, of which an illustration is given. But Mr. Westlake points out, what is indeed obvious from the two illustrations given, that there is no similarity of style between the two, as far as design is concerned, and that if, as seems probable, Fauconnier executed them both, he was the executant only, not the designer. Yet no name save his is recorded in connexion with them. The conclusion is that things were possibly not so very different then from what they are in the present day.

The chapter on French work contains a great number of interesting examples, from which we give one, from the original engraving, that of a window in St. Eustache (fig. 4).<sup>\*</sup> This is a curious example of that conflict between Renaissance and the remains

of Mediæval architecture of which St. Eustache is itself a type; for it will be observed that while the tracery in front of the window design is a reminiscence of Flamboyant form, the design of the window is frankly and entirely Renaissance. In its perspective treatment of the architecture it is entirely in controversy of the proper spirit of stained-glass design; yet it is unquestionably an interesting work, and there is a certain dignity and spaciousness of effect imparted to it by the comparatively small scale of the figures, which seem subordinate to the architectural background, instead of forming, as is usual in Mediæval windows, the principal and central objects to which the architectural accessories form only the framework. As to these windows Mr. Westlake remarks "though the work is late, and the designing of the figures less meritorious than in some works of earlier date, I know of none more carefully considered in regard to the building in which it was to be placed"; and in this we cannot but concur.

One of the most interesting portions of the book is that devoted to Flanders and Holland and Germany. It is true that if the colouring of the designs were given one might look at it from another point of view, but in force and originality of mere design there is much that is very remarkable in the late stained-glass art of the Low Countries and Germany. The "St. George," from Antwerp Cathedral (fig. 5), is a notable example of what may be termed entirely Gothic feeling in a window which is nevertheless Renaissance in date; it is Gothic, that is to say, in its downrightness and earnestness of expression, and the absence of anything like studied effect of attitude, and also in its rather *naïve* drawing. The severe precision with which the lead-lines follow and outline all the figure is also noticeable, and is to our thinking a fine point in the design, for we have not much sympathy with the theory of affecting to disregard the lead-lines and take them only as necessary technical incidents not affecting the picture. The leading is far too prominent an incident in a stained-glass window to be got rid of in that way; where

it crosses and interferes with the main lines of the design it is impossible to forget it; and by far the most artistic treatment is to make it encase and outline the design after the manner of *cloisonné*. This is one of the figures from the window set up in honour of Henry VII. of England, of which Mr. Westlake gives also a complete illustration. It is a four-light window, the lower compartments of which show two three-centred arches (like that in fig. 1) crossing the mullion and extending over two compartments. The effect of this is not very good, more especially as the single figures in the lower portion of each compartment are separate and unconnected designs, and there is therefore no æsthetic propriety in connecting them in coupled groups by the architectural background, while the mullion cutting through the centre of the arch has a very harsh effect. It would have been better if the same harmony between the technical construction and the design which is shown in the St. George figure with its leading, had been also carried out in regard to the architectural lines of the whole window, which nevertheless is a fine work in the main.

German glass, Mr. Westlake observes, is characteristically German; even when the designs came from foreign sources they were immediately stamped with the peculiar German idiosyncrasy. And one of the German practices, and a very questionable one, was that of carrying the subject all over the window independently of the mullions. Several curious examples of this are given among the illustrations. As to the other qualities which belong peculiarly to German work in regard to style and manner of design, there could not well be a more thoroughly characteristic specimen than is furnished by the illustration of the window now in Trinity College Chapel, Oxford, of which we give a reduced copy (fig. 6), and which, in spite of its present ecclesiastical position, is really a piece of German or Swiss chamber-glass, and is included by Mr. Westlake under the heading of "secular painted glass." There is an utter want of refinement and grace in this; and yet this

<sup>\*</sup> Of the illustrations accompanying this article, figs. 4 and 5 are from the books used in the book, and lent by the publisher; the remainder are reduced fac-similes of engravings in the book.



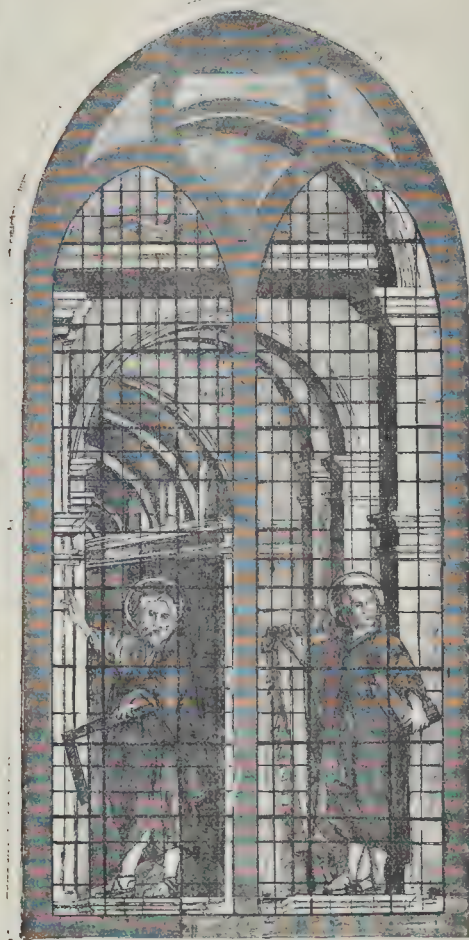


Fig. 4.—One of the Cloister Windows, St. Eustache, Paris.



Fig. 5.—St. George: from a Henry VII. Window in Antwerp Cathedral.



Fig. 3.—From the Holy Ghost Chapel, Basingstoke.



Fig. 9.

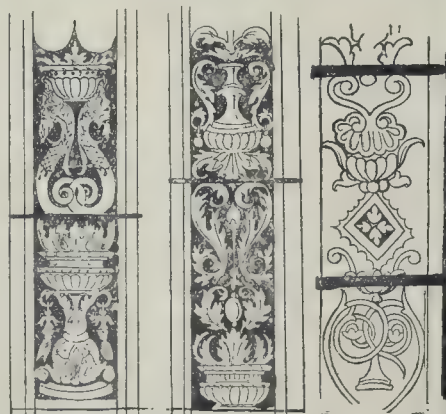


Fig. 7.

Fig. 8.





Fig. 6. German or Swiss Chamber Glass, now in Trinity College Chapel, Oxford.

big burly figure, with its sumptuously-leathered cap, has a kind of lusty bravura about it the force of which is undeniable; and the bold free ornamental work forming the background is remarkably effective.

We add some bits of border pattern reduced from the smaller illustrations. Fig. 7 represents two borders from St. Peter's, Cologne; figs. 8 and 9 are from Grande Andelays, France, very different, however, in character (their dates are not given), fig. 8 being distinctly Renaissance, while fig. 9, though with a Renaissance border, is decidedly Gothic in the character of the inner surface ornament.

The book of which this volume is the conclusion forms a most valuable repository of information on the beautiful and interesting subject of which it treats, not only in the shape of historical data, but from the immense number of illustrations of design of all styles and dates, and representing every locality where stained glass of importance is to be found. The leading element of colour is of course wanting, but the effect of that, as all stained-glass artists have long recognised, it is hopeless to attempt to give in chromo-lithography; besides which, the employment of so expensive a process would necessarily have very much curtailed the illustrations. It was better, therefore to keep to the illustration of design only, and leave the colour to the reader's imagination. We congratulate Mr. Westlake on the completion of the work, which will long remain a standard one of its class, and indeed for thoroughness and variety of illustration is, as far as we are aware, quite unapproached among English publications on the subject.

NOTES.

AT the meeting, last August, of the British Association (at Oxford), Mr. Arthur Evans gave some account of his discoveries in Crete, and at the meeting of the Hellenic Society on Monday Mr. Evans read a further paper on the subject, fully illustrated by diagrams. Both he and his audience suffered from the inevitable fact that his deductions were based on a mass of minute detail, difficult to set forth in any sort of popularly-intelligible form, even to a comparatively expert audience. We shall reserve all detailed criticism till the facts are published, and content ourselves with the broad statement of a theory which, if it prove sound, will revolutionise not only the whole history of the primitive civilisation of the *Egean*, and with it that of "Mycenae" art, but also incidentally may solve the problem of the early relation of Egypt and Greece, and the apparently remoter question of the origin of the Hebrew alphabet. Crete is the central point of Mr. Evans's investigations, and oddly enough he was there substantially helped by a modern superstition. The women of Crete collect and wear as charms (milkstones), ancient gems on which are found certain picto-graphic symbols. Even when he could not prevail on the owners to sell these, he was able to take impressions, reproductions of which he laid before the Society. These picto-graphic symbols not only recur, but recur together in the same collocations—e.g., a gate together with a bent leg, two horns together with a star. Sometimes they are manifest reproductions of an earlier gesture language

—e.g., in the case of raised hands, so that we are brought to the very *origines* of written speech. These picto-graphic symbols occur not only on Cretan but on Egyptian and Hittite monuments, and it is, of course, from the Egyptian instances that chronological data arise. Out of this picto-graphic system arose, as the diagram clearly showed, a linear system such as Mr. Petrie has discovered on *Egean* pottery, and which survived down to late times in the Cypriote writing. Incidentally, Mr. Evans made the interesting remark that the picto-graphic system survived to late times in the well-known magistrate's marks on coins—e.g., a magistrate whose name is *Leon*, signs with an actual lion's head. Nowhere is, according to Mr. Evans, the development from picto-graphic to linear more clearly seen than in the Hebrew alphabet, where the picto-graphic bull's head yields the letter Aleph itself, the Hebrew for bull. The picto-graphic eye gives the "circle" or "double circle" *Ain*—itself the Hebrew for eye, and so on in many examples. These picto-graphic and linear symbols, closely related, occur in monuments hitherto known as Mycenaean, and which we may henceforth have to call Cretan. And here comes in the last step of Mr. Evans' argument, Who are the primitive dwellers in Crete, the Eteokretes? Who were these intermediaries between Egypt and Semitic lands to whom Mycenae owed her splendour, and to whom the whole Mediterranean basin owed the beginning of its culture? None other, according to Mr. Evans, than the Philistines, our household word for the uncultured. The first smile is irrepressible, but as soon as the full facts are before us in the *Hellenic Journal*, we hope to return to this curious paradox.

AT the last meeting of the Berlin Archaeological Society Professor Curtius read a paper containing a new explanation of that old standing *crux*, the central slab of the east frieze of the Parthenon. Archaeologists are divided on this subject into two camps. The conservatives, and among them the British Museum authorities, still hold to the old view—recently revived with fresh arguments by Dr. Furtwängler—that the scene represented is the offering of the peplos. The younger school, headed by Dr. Waldstein, noted, and rightly, that the supposed peplos group balanced in structure, and, therefore, necessarily in subject, the group of maidens presenting the diaphroi or seats, a ceremony preparatory to the Theoxenia, the banquet of the assembled gods. Their premiss was just; but the conclusion drawn from it, that the scene represented a priest depositing his outer garment preliminary to sacrifice, was inadequate and very doubtful. Professor Curtius makes a suggestion, that binds the slabs into one significant whole relative to the Theoxenia. He holds that the priest receives the huge folded carpet, "strewn" for the banquet. A boy might well bring this, whereas he would scarcely bring the peplos woven by the maidens for the Maiden. The *στρώσις*, the strewing of the carpet, was as much a part of the ceremony as the setting of the seats. It will be interesting to see how this suggestion is received.

WE have referred to the unfortunate controversy at Berlin as to Herr Wallot holding one of this year's "large" gold medals for his design for the Imperial Houses of Parliament, which was exhibited at the Salon. The list of awards has now been published, and we actually find that the lady painter of small ability, who chances to be a Court favourite, has the distinction the Berlin artists intended for Herr Wallot. The names of the "large" gold medallists are Professor Koner, Señor Villegas, and Madame Parlaghi. Among the recipients of "small" gold medals are Professor Wallot



and Professor Schwechten. The latter is the architect of the Emperor William Memorial Church. The Society of Artists have at once elected Herr Wallot an honorary member, as a sign of their appreciation of his work. It is understood that Herr Wallot leaves for Dresden, to take the professorial chair he has accepted, directly after the opening of the Imperial Houses of Parliament.

A GLASGOW correspondent, in a letter which is too long to publish (as much of it is not to the point), complains of the observation in Mr. Penrose's recent address at the Institute, that Cockerell was the only architect except Schinkel who had made any success in the application of Greek architecture to modern buildings. He instances Playfair's Royal Institution at Edinburgh; and that no doubt is a fair example, and a very successful and fine design of its type. Hamilton's fragment of a Parthenon, on the Calton Hill, and the Burns Monument, are, however, mere copies. Our correspondent proceeds to instance the late Mr. Thomson, of Glasgow, but he did not belong to the period of which Mr. Penrose was speaking; and, moreover, his works could hardly be called Greek design in the same sense as those of Cockerell, Schinkel, and Playfair; they were rather a neo-Greek evolved by himself; nor do we think they will permanently command the degree of admiration once bestowed upon them. Playfair, however, had certainly a claim to recognition in connexion with the subject.

THE London County Council have passed a resolution which is as tyrannical as it is foolish: it is that every officer and workman in the employment of the Council should devote his whole time to the Council's service, and should not be allowed to take any private business or paid employment. The matter arose because some of the gardeners of the Council work for private employers after their day's work is done. It is not contended that any of the officers or workmen of the Council employ the time which properly belongs to the Council in the service of others. But the Council object to men using their leisure to increase their earnings. If, said Mr. Stuart, the Council allowed their men who worked eight hours to compete with other men by doing additional work outside the Council's service, they would defeat the principal object of giving shorter hours and better pay to their men. This motion is an endeavour to carry the dominion or master-ship of the Council into the homes of its workmen and officers. According to this resolution, if a painter in the employment of the Council tried to make something extra by painting his poorer neighbour's room on a summer evening, he would be liable to some kind of punishment. This is as tyrannical as it would be for the Council to interfere with the amusements of its employes. It is an absolute attempt to prevent men from bettering their condition, which is essential to a wholesome state of society. It is neither more nor less than an incentive to idleness. As to its folly there can be no doubt, for even with an army of inspectors it would be impossible for the Council to know generally how their officers or workmen employed their time when they were miles—it may be—away from the work of the day. That this policy will introduce a system of espionage, by which some bad men will seek to pry into their neighbours' affairs in order to obtain their dismissal or levy blackmail, we cannot doubt. We can only hope that the Council will, as soon as possible, have the sense to cancel this unfortunate motion.

MR. LEANING, who is well known to many of our professional readers, in a letter in the *Times* this week, called attention to the fact that some of the candidates

at the recent School Board Election advocated the direct employment, when possible, of labour by the Board, and he urged that such a step as this would tend to raise the rate for School Board expenses. We do not think much alarm need be felt on this score, for it would be impossible for the School Board to establish a Works Department as the London County Council have done. The amount of their building operations is not sufficiently large for such a department, and it is such scattered work that it can probably be done cheaper by local contractors under thoroughly careful supervision. We should certainly have been glad if candidates for the Board had given their views more largely on the subject of the buildings of the Board; but these practical questions have been largely lost sight of in the din of religious controversy. Mr. Leaning makes also several points against the new system of the County Council in conducting their own works and not employing a contractor; but it would require a very long and close investigation of figures, and of the work done, to estimate with any certainty the success or failure of this new departure.

A VERBATIM report of the proceedings at the recent meeting of cement manufacturers (to which we alluded in "Notes" in our two last issues) has now reached us. It is somewhat curious reading. The object of the meeting was nominally to form an association for the purpose of putting a stop to the adulteration of Portland cement, but really it was to induce cement manufacturers, if possible, to sign a statutory declaration that they had not—to put it in plain English—at any time added any material to their cement-clinker or cement. The declaration, it will be observed, is merely retrospective; it does not bind the signatories as to their future conduct. This is certainly a strange feature; for if there be any virtue in so forcibly disclaiming "adulteration" in past years, surely it is advisable to take an equally forcible oath against "adulteration" in the future. But the *crux* of the whole question lies in the meaning of the words "adulteration" and "adulterant," and until these are carefully and exhaustively defined it is folly, and worse than folly, to proscribe the addition of any and every material to the calcined chalk and clay. Certainly statements were made at the meeting which seem to show that Kentish rag-stone, and also some other kinds of stone, may be not only not adulterants, but actually beneficial ingredients, of Portland cement. It seems to us that there was more in the convening and object of this meeting than meets the eye; and after reading the detailed report we are of opinion, while utterly condemning the practice of wilful adulteration, that the attempt to cram this statutory declaration down the throats of cement manufacturers is a mistake, and will benefit no one.

IN the report of the Medical Officer of Health to the Hackney District attention is drawn to the exceedingly polluted state of the River Lea, especially because it is part of the scheme for the conversion of Hackney Marsh into a public open space, initiated by the London County Council, that the water of the Lea should be diverted on to certain parts of the Marsh to form artificial pools. As Dr. King Warry truly observes, unless some steps are taken to render the Lea water freer from pollution this act will be fraught with danger. It is obvious, that if some of the Lea branches, where the water is somewhat shallow (although the flow is fairly good), become offensive in hot weather, the proposed lake, where the flow will be reduced to a minimum, will also become offensive. Such a prospect is anything but encouraging to those interested in the future open space called the Hackney Marsh. By the Act of Parliament which constituted the present Lea Conservancy Board it appears that one of the primary duties of the Conservators is to prevent the pollution of

the river; and Dr. Warry suggests that, in the interest of the public health, the Hackney Vestry should request the Conservators to do their duty in this respect.

THE site of Nos. 8, 9, and 10, with front gardens, in Nevill's-court, Fetter-lane, being about 5,200 ft. superficial, is to be let upon an eighty years' building lease. The property belongs to the Moravians (United Brethren). No. 10 has a notable history, which is apparently little known. It was bought, for we are informed 700*l.*, in 1738, with the adjacent chapel where Turner and Baxter preached, *temp.* Charles II., for the Moravian congregation when they first settled in England. It served for many years as the missionaries' hostel in connexion with that community's mission work, and there they began to print, one hundred years ago, their "Periodical Accounts," a journal of the society's evangelical labours. It was the home of the Rev. C. Ignatius La Trobe, secretary to the mission, and friend of Haydn; also of Count Reuss, minister of the congregation, and an intimate friend of the late Prince Consort. The red brick house, opposite what used to be the Excise Office, is conspicuous for its number of windows, and a heavy cornice. The interior is spacious and handsome, but a fire consumed last March the fine carved panelling of a room on the ground-floor. The *Antiquary* for the current month speaks in somewhat highly-coloured terms of the building and its garden, saying it is the old palace of the bishops of Chichester, and that "the present late Elizabethan pile replaced the building mentioned by Stow." Stow tells us that the bishops' house was next to the inn which (in 1286) the Black Friars conveyed to Henry de Lacy, Earl of Lincoln; he quotes Matthew Paris's account of its erection by Ralph Neville, Bishop of Chichester, who died there in 1244. The bishops' "inn" stood, it seems, on the west side of Chancery (the Chancellor's) lane, where are still Bishop's court and Chichester-rents, and opposite John de Herlicum's forfeited garden. Dugdale cites two entries from the Close Rolls, by one of which Henry III. grants to Neville in 1226:—

Gardium cum pertinentiis quod fuit Joannis Herlicum in novo vico [Chancery-lane] ante Novum Templum Londini quandiū Domino Regi placuit, et another, of 1229, confirming to him Chancery-lane.

Placeam illam cum gardino et pertinentiis suis quod fuit Joannis Herlicum in vico illo qui dicitur Nevill's-court ex opposito terræ ejusdem Episcopi in eodem vico. Bishop Richard de Wiche, commonly called St. Richard, died in 1253; to him was dedicated the first chapel in Lincoln's Inn, and many of his successors occupied the house, Chichester Place, in Chancery-lane. By leases of Bishops Sherborne and Sampson, in the sixteenth century, most of the See's property there, together with de Lacy's house, passed to students of the law. In the thirteenth and fourteenth centuries we find the bishops paying the Prior of the New Temple 30*s.* a year in respect of ground in Fyckett's Field (New Square), "pro domibus suis in suburbio Londini"—a payment re-leased to Bishop Stratford in 1338. Sampson's conveyance to William and Eustace Sulliard, 1536, specifies the Bishop's house and garden "on the south side of Lincoln's Inn." According to a statement printed in the *Reliquia Spelmanianæ*, Chichester Place was standing in James I.'s day, and its then leaseholders are mentioned. Moreover, in an Inquisition of Annoyances of the City of London, 1316, the house of John Langton, Bishop of Chichester, Lord Chancellor in 1292 and 1307, is described as being in Chancellor's-lane, which he had stopped "levando ibidem duas stapulas cum una barra."

THE *Illustrated Archaeologist* is to be amalgamated with the *Reliquary*, and the first quarterly number will be issued at the beginning of January next. Messrs.



more & Sons will be the publishers, and J. Romilly Allen the editor. By combining the good points of these two magazines an appeal will be made to a larger number of readers than either could command by itself. The aim of the managers of the new venture will be to popularise the study of our national antiquities by means of short readable articles, fully illustrated; avoiding as much as possible the dry technicalities which render the proceedings of most archaeological societies so unattractive to the general public.

# THE Exhibition of Drawings in Black and

White now on view at the Graphic Gallery, 195, Strand, although containing no works of special importance, is yet of interest indicating a general raising of the standard this class of work. The drawings consist of the originals from which the reproductions in the *Graphic* and *Daily Graphic* have been taken during the last few years. Amongst these we note the well-known studies of horses, and scenes in which horses take up the most prominent position, by Mr. John Charlton; these are executed in wash, as are also the works by Mr. F. Dadd, Mr. W. Wall, and Mr. A. Hopkins, who is specially commendable in the life and character of his river and social scenes. The drawings of London life and character by Mr. Paul Amundson exhibit, more faithfully than the reproductions of his work, the care and accuracy of his characteristic delineation, while the chalk portraits by Mr. T. Blake Wigram are striking examples of delicate finish in this direction, as also are some of Mr. Reginald Cleaver's studies for the *Daily Graphic*, of which a fairly large number are shown. A "black and white" executed in ink is one of the exhibits; and this medium, it seems, seems to lend itself well to the use artists who are unfamiliar with any other method. Architecture is in general poorly represented, but Mr. H. W. Brewer has a large pen-and-ink drawing, some 5 ft. by 2 ft., with slight indications in wash, of a Cambridge, treated as a bird's-eye view, which is a good example of his painstaking and careful style. The exhibition shows, as already intimated, an improvement in the general level of black and white work, but we have to stop here? Surely the art which caters for the multitude, which in educating influence has hardly its equal, and which, in these days of half-tone blocks, penetrates everywhere, is worthy of greater sympathy and attention from the best among our artists; and is it too much to hope that the day is approaching when the most gifted of our artists will be found to devote themselves to the public in this direction? It is largely so in the United States, as there some of the best talent is employed on book illustration. If the Academy were to open its doors occasionally to the election of men prominent in black and white work, it would at least be helping to foster a phase of art which at present is left too often to those who have perhaps failed in another direction.

THE collection of water-colour drawings by Mr. Sutton Palmer, exhibited at the Fine Art Society's Gallery under the title "Woodland and Water," contains many very attractive drawings showing very successful realisation of aerial and sun-light effects, but perhaps open to the charge of being a little too "pretty" in style. Indeed, Mr. Palmer seems to have two styles; and we prefer the broader and vigorous one shown in such drawings as "A Tributary of the Dart" (16), "Bisley Common" (49), "Great Langdale" (52), "A sketch of the New Forest" (65), to the more smooth and delicately-worked drawings which form the bulk of the collection. The popular verdict, no doubt, would be in the other direction. Among the more elaborated drawings is a fine view of Durham Cathedral (20), from a point on the river opposite to that from which it is generally taken.

Others that we specially liked are "Looking down on the Nidd" (11), "Knaresborough" (61), and "Head of Loch Lomond" (82), in which the lighted middle-distance is very good.

"A TRAVELLER'S Complaint" in the *Times* is that he finds churches and cathedrals locked at times when he wishes to see them, and when it would be reasonable to expect that they should be open. We sympathise deeply with "Traveller," and have often given way, we fear, to un-Christian temper at finding churches under lock and key and cathedrals barred by the payment of a fee, accompanied by the compulsory imposition of a guide, which latter is a real grievance.

"To that man's mind who understands." But the other side of the question is somewhat convincingly put by Mr. Albert Hartshorne, to the effect that the more rigid custody over cathedrals and churches exercised in England, as compared with other countries, is a direct result of the bad habits of the English middle and lower class public, who will break and damage things, if not looked after, either out of pure mischief or from the vulgar desire to possess relics. The public in other countries do not behave in this way, and hence are allowed free access to their churches. There is a good deal in this; but in regard to churches, of course, some allowance must also be made for the difference of feeling and habit in Catholic countries, where the church is a place of prayer for the faithful at all times, instead of being regarded merely as a place to go to on Sundays.

IN connexion with the subject referred to in the foregoing "Note," we may observe that some painful details have been brought to light as to the treatment of St. Sophia in the hands of the Turks, where "G. A. S.," writing to the *Times*, states that he has seen a Turkish functionary there battering down bits of the mosaic, for a small fee, to give to visitors. This is an interesting comment on the view which some people seem ready to maintain that the great church has been better off in the hands of the Turks than it would have been otherwise. Two architectural injuries at least the Turks have done (whether the mosaic-battering story be true or not): they have distorted the line of the building by their obliquely-placed furnishing to give the true direction of Mecca, and they have injured its scale and its general effect by the texts in Broddingnagian Turkish characters stuck up on the walls. From an architectural, if not from any other point of view, we have sometimes thought that a new Crusade might be proclaimed, to rescue St. Sophia from the hands of the Turk. It would elicit very considerable sympathy and support from those who are interested either in architecture or in history.

WE referred last week to the conditions for a competition for a chapel at Portmadoc. In the course of a somewhat impertinent letter which we have received from a member of the committee, it is stated that they have now raised the architect's commission from 4 per cent. to 5 per cent. on the outlay: which shows that public criticism on these points is not without its effect. Nothing is said, however, as to rescinding the preposterous condition that the architect is to pay his own travelling expenses in superintending the building.

A CORRESPONDENT sends us two advertisements from a Birmingham paper, which form an interesting commentary on the question of "Architecture, a Profession or an Art?" The wording of the advertisements, omitting names and addresses, is as follows:—

"MANUFACTURING and business premises and building sites for Sale and to Let.—For particulars see ———'s Land and Property Advertiser, obtainable gratis at their offices" (address follows).

"RESIDENCES erected in any locality to suit the requirements of purchasers upon advantageous terms of payment.—Further particulars on application to ———, architects" (address follows).

The blank in each case is filled by the name of the firm, which consists of three partners, of whom the senior member is a Fellow of the Institute, and the second member an Associate of the same body. This may be "business," no doubt; but is it architecture?

# THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE second meeting of the present Session of the Royal Institute of British Architects was held on Monday last, at 9, Conduit-street, Mr. Alexander Graham (Vice-President) in the chair.

Mr. W. H. White (Secretary) announced the decease of Mr. Charles G. Hood Kinnear (Fellow), Edinburgh, and of Mr. Frederick Hemmings (Associate), London.

The Chairman stated that the following twenty-nine probationers had passed the Intermediate Examination, and had been registered as Students of the Institute, viz:—

Percy Morris, Blackheath; Thomas Sharpe, Kendal; Christopher William Surrey, South Kensington; John Cubbon, Birkenhead; George Lewis Sheppard, Worcester; Charles Samuel Frederick Palmer, Kilburn; Edgar Stones, West Hackney, N.E.; Albert Herbert, Leicester; Harold Conybeare Trimnell; Arthur Maryon Watson, E.A. Lond., 9, Nottingham-place, W.; Henry Tully Fowler, Kendal; Arthur Wheatley Waddington, Mirfield, Yorkshire; Alfred Harry Gloyne, Shetford, Manchester; Gilbert Love, Bath; Thomas Hubert Harding Vowles, Chorlton-on-Medlock, Manchester; George Edmund Clay, Warrington; Henry Edmund Davey, Peckham, S.E.; John Forrest, Warrington; Harry Daborn Day, Godalming; William Frederick Baron Gates, Wing, Bucks.; Henry Augustus Ellis, Cambridge; Charles Vincent Calle, 176, Stockwell Park-road, S.W.; James Herbert Norris, Godalming; Vincent Steadman, Clifton, Bristol; Ralph Henry Morton, South Shields; Harold Stevens, Liverpool; Edward Lewis Harrison, Hampton Wick, Kingston-on-Thames; Henry Francis Traylen, Stamford; Stephen Ellwood Barrow, Jesmond, Newcastle-on-Tyne.

Of the nineteen Probationers who were relegated to their studies until next March, six were relegated in all subjects of the Intermediate Examination, two in six subjects, one in five subjects, five in four subjects, one in three subjects, and four in two subjects.

# The Architecture of China.

In the absence of Mr. Frederick M. Gratton, who was on his way to Shanghai, the paper which had been prepared by him, entitled "Notes upon the Architecture of China," was read by Mr. W. Kidner. The following is a short abstract of the paper:—

There are, in China, cities of four classes: those of the first rank termed *Foo*, the second *Chow*, the third *Ting*, and the fourth *Hsien*. In ancient China the number of *foos* amounted to 159. At the present time there were said to be 1,281 cities encircled by high crenellated or embraused walls, averaging from 25 ft. to 30 ft. in height, sometimes flanked with towers. They were of stone, of brick with stone or granite bases, or with stone or granite facings; substantial structures of carefully-prepared and good material. Among these cities were Pekin, the present *yellow* capital; Nankin, previously the capital of the empire; Hangchow, also formerly the imperial capital, and of great historical interest; Soochow, the "City of Beauty and Pleasure," the Paris of the Chinese; and Canton, one of the first cities of the empire, with walls some 20 ft. thick, and varying from 25 ft. to 40 ft. in height.

Shanghai was a *hsien*, with brick walls three and three-quarter miles in circumference, and seven gates. There was an immense suburb outside the walls. Several cities, like Cheng-tu (*foo*), the capital of Szechuen, were clean and in good preservation, with wide paved streets, and in all respects fine cities, hives of industry and centres of trade; whilst others were evil-smelling places, with narrow alley-ways and dense populations.

An exceedingly rare example of a three-storied erection was the "City Temple of Soochow." Some of two stories in height were still to be found; but by far the larger proportion were lofty one-storied buildings, with massive open-



timbered roofs, originally dedicated to the service of individual deities, but now employed in a mixed worship of the triumvirate of Buddhist, Confucianist, and Taoist divinities. The general plan was of three buildings, or halls, parallel with and behind one another, each entered through the other, the third being the largest and most important. The workmanship was solid, with a plethora of ornament. The approach was often by fantastic bridges, or massive flights of steps and handsome gateways.

Magnificent temples and shrines had been erected in the imperial capitals. Of these might be mentioned the Temples of Heaven and Earth at Peking, each in a square, park-like, walled enclosure of some three miles circuit. The former contained the north and south altars; circular, roofless, terraced platforms, encased in white marble. The northern altar was in three terraces, diminishing from 120 ft. to 60 ft., each surrounded by a marble balustrade. The platform was approached by eight triple flights of nine steps each, and carried the circular fane dedicated to the "Queen of Heaven." The roof, rising in three pagoda-like heights covered with glazed tiles of a lovely cerulean blue, was open-timbered, giving view to the highest point of the gilded interior. The main and second roofs were supported by twelve elaborately decorated columns, and the highest one by four pillars. Midway between the two altars stood the circular tower containing the tablets, also roofed with blue tiles, the window openings filled with blue glass rods, which produced a dazzling effect in the sunlight. The southern altar was very similar to the northern, its approach being spanned by two sets of three beautiful white marble memorial arches (*Pei-loh*). The Temple of Earth was in many respects like the Temple of Heaven, save that the predominating decorative colour employed was green, and that it was much simpler in style and adornment, the altar being square. Temples were also erected to Light, and to the Sun and Moon. To judge from the records, these temples must have been marvels of beauty in the day of their prime. Several buildings had been considerably damaged by fire in recent years.

The Yung-ho-Kung, or great Llama Temple, in the Tartar City, was roofed with brilliant yellow glazed tiles. The entrance was adorned with animals carved in stone, and the interior almost covered with innumerable carvings of birds, beasts, men, &c. In the Main Hall stood an enormous wooden figure of Buddha, some 70 ft. in height, coloured to imitate bronze. There were, besides, the "Imperial Ancestral Temple," and the Tai-miao, or Imperial and National Temple, in Peking.

What were called by the Chinese "Beamless" temples might be seen near to the Ming Tombs at Nankin, at Soochow, and a few other places. They were stone and brick structures of considerable size, with parallel walls forming several chambers, and covered with brick barrel-vaulted arches. Some were now little more than ruins; others had many arches still standing after surviving centuries of neglect; there was an entire absence of wood in their construction. They were said to have been erected about the eleventh century A.D., during a period of great Buddhist fervour, as fire-proof repositories for archives and relics.

In regard to palaces, but few remained. The celebrated Yuen-Ming-Yuen, or Summer Palace, was a gem of art. It covered about twelve square miles, and contained some thirty distinct residences for the emperor, ministers, eunuchs, servants, and others. Passing through the grand portal into the paved courtyard, the great reception-hall, or Hall of Audience, 120 ft. long, 42 ft. wide, and over 20 ft. high, in all the glory of its gilding, painting, and carving, met the eye, erected upon a granite platform, surrounded by a peristyle of wooden columns, with graceful roof and elaborately-fretted eaves. Facing the central door was the emperor's carved ebony throne on a marble-tiled floor. Here were grouped all the royal luxuries that an Eastern mind could conceive; whilst pleasure grounds, buildings, rockeries, lakes, grottoes, in almost bewildering plenty, occupied the vast and magnificent park-like domain, the private suites of rooms of the emperor and empress, containing all that was lovely, attractive, and picturesquely fantastic in Chinese art. Such was one of China's palaces at the time of the Anglo-French invasion, but barely spared from the general wreck of much that could claim architectural merit in her capital.

Pagodas were constructed of various materials, from wood to cast-iron, and mention was made in Chinese records of some of white marble and copper. They varied from three to thirteen stories

in height, nearly always, however, consisting of an odd number, and usually pyramidal in contour. Some were solid with no interior chamber, others hollow; the larger ones of the latter class contained, instead of an altar, a smaller pagoda inside the larger structure. One of thirteen stories existed at Peking 275 ft. 5 in. high, the figures being formed of moulded brick. The Peh-ta-sze, or White Pagoda Temple, erected in 1100, and rebuilt in 1819, was said to have had the appearance of jasper, and contained 2,000 clay models of pagodas, besides images, its most conspicuous feature being the great copper umbrella-shaped top.

The porcelain tower of Nankin was originally designed of thirteen stories, only nine of which were executed; it was commenced in 1412, and took twenty years to complete. It stood on a raised platform, and mounted to a height of about 250 ft. It was octagonal in plan. The general effect was described by a Chinese writer as having been of dazzling brilliancy; the predominant colour was green, and it was one of the best examples of its class. It contained about 2,000 images, and had 150 bells pendent from the roof. It was destroyed by the insurgents in 1856-57, and was an irreparable loss to the country.

Some so-called pagodas might be better called towers. Those of Wuchang and Peking were curiously-shaped structures, with a much greater approach to domestic than religious origin and uses. The summer-houses and garden pavilions were also pretty and attractive to a degree.

In regard to memorial arches and gateways, the *Pei-loh* (often mis-named triumphal arch) was a memorial arch or gateway, sometimes comparing closely with its probable ancestor the *Toran* of India, and their offspring the *Torii* of Japan. Some were solid and massive erections, whilst others consisted of perpendicular shafts of granite, stone, marble, or wood, with horizontal ties; or, as in the more elaborate examples, with enriched entablatures, covered with projecting roofs at various levels, often with several spans in a row. They were often elaborately pierced and sculptured, richly ornamented with bas-reliefs and inscriptions, the harmony of colouring rendering the effect greater than could be readily described.

The Mausolea and Tombs of the emperors and grandes were imposing resting-places. The Ming Tombs, now in ruins, near Peking, had been elaborately described by various authors. The spacious roadways or avenues of approach to these sacred precincts were usually lined with colossal figures in stone or granite monoliths, of elephants, camels, lions, dogs, horses, mythical animals, and men, in successive pairs at regular intervals—the approach to the Ming Tombs having thirty-two pairs of these images, the largest about 12 ft. in height.

The principal highways of China being her navigable rivers and canals, the number of bridges was legion. Suspension-bridges of rude form, and with but the barest elements of engineering skill, appeared at intervals in various parts of the country; but by far the greater proportion were those with flat spans and piers, or arches of varying shapes, built of stone, granite, marble, brick, or combinations of these materials.

The *Wan Shou Ksiao*, or bridge of "Ten Thousand Ages," at Foochow, in the province of Fokien, was one of the best-known and most celebrated of the flat-spanned variety. The bridge was nearly 2,000 ft. in length, and 14 ft. in width; the roadway of solid blocks of grey granite, resting on piers of the same material.

A bridge near Peking, commonly termed the "Marble Bridge," was of seventeen stone-arched spans, the roadway being protected by white marble balustrades. The nine-arched marble bridge near the same capital was more legitimately entitled to the name, as marble was more generally employed in its construction. This was some 600 ft. long.

The majority of the arched-bridges of China were of stone or granite. The *voussoirs*, instead of being thick blocks of stone with radiating joints, were generally of thin curved or shaped slabs laid lengthwise with the arch, the slabs often measuring 4 or 5 ft. in length, by a couple of feet wide, and some 6 or 8 in. thick. Alternating with these long courses were narrow *voussoirs* at right-angles to the slabs, keyed into the masonry backing.

Long before the Greeks or Romans understood the properties of the arch, it was known and employed in China.

The Chairman said there could be only one opinion about the importance attaching to this subject. Architects were all more or less tra-

vellers, but he did not believe that many of them had been in China, and passed through the gates of Peking. At the same time, he was sure that some of them had noted the peculiarities and characteristics of that very remarkable people the Chinese, and had seen in their methods of construction many things which were not only of interest to them, but which must have exercised an influence on the architecture of other countries.

Professor Aitchison proposed a cordial vote of thanks to Mr. Gratton for his paper, and to Mr. Kidner for kindly reading it. As had been remarked, they were judges, or students at any rate, of all the architecture which the world had seen, and they were greatly in want of it, for while almost every country had produced a style of its own, this country had yet to take that step.

He hoped, however, it would not be long before they did that, considering that they had the whole world before them, and that a large proportion of the members present had travelled in different parts of the earth. He envied Mr. Gratton the opportunities he had had of seeing the splendid way in which the whole of the interiors of the temples and other buildings of China were coloured, and it was one of the things they would all look forward to seeing introduced into England more than it had hitherto been. It was sad to think that the parsimony of our Government prevented the great discovery of the Palace of Darius at Susa being made by an Englishman. The consequence was that the Louvre now possessed some of the splendid friezes done in glazed bricks.

The French, too, with the aptitude of artistic skill which distinguished them, immediately set to work, and at the last exhibition at Paris almost all the roofs were clearly animated by the lessons they had learned from that monument of colour in Persia. He wished the paper had given them a little more account of the charming lighting which was carried on by a lamina of oyster-shells. Until the introduction of glass at a low rate, very few openings were glazed. The few that were glazed in old times—as he had seen in out-of-the-way places in Italy—were glazed with parchment, while others had shutters, pierced not like the ornamental ones, but simply with bars put together into patterns. They were very much indebted to Mr. Gratton for his interesting paper, and also for the photographs shown on the wall, and he hoped at some future time they might have drawings of the coloured temples which the author had seen.

Sir Henry Howarth, in seconding the vote of thanks, said the subject contained many points of interest. He could not help thinking that English architects might sometimes well take a few lessons from the Chinese. When one saw changes in the shape of the buildings and their ornamentation it was certain that there had been contact with some other race and civilisation which had brought East and West together, and had diverted the whole course of construction and ornament into an entirely different line. For instance, the astronomical constructions at Peking, which were shown on the wall, were designed by the Jesuits for the Chinese Emperor. Going further back it would be found that Persian workmen, who went into China in 1260, introduced the making of blue-and-white china, for what was termed the blue Nankeen China was a product absolutely unknown before that period. The Chinese quickly adopted this, and the beginning of the blue-and-white Chinese porcelain dated from that time. Then, again, some of the towers which, undoubtedly, were copies of wooden architecture, were, he believed, imported into China by the Buddhists from India, in the sixth and seventh centuries. He agreed with M. Dieulafoy, that the earliest civilisation of China came from the West, and amongst other things the art of making bricks, which were made of curious sizes and shapes, and were distinctly imitations of those found in the ruined mounds of Elam and Mesopotamia. The pagodas with many stories had been primarily copied from the pyramidal buildings found in Chaldea, and were one of the many proofs that the early civilisation of China came from that direction.

Mr. R. Phené Spiers said that though he had never been to China, he had inspected the photographs with great interest. Many of them were quite unknown to him, and he had been struck with one of the first parts of the paper—referring to the resemblance to Chaldean and Babylonian structures. What Sir Henry Howarth had said had rather shown him that the resemblance was not accidental, but was possibly due to the fact that in the very

West about English (architects) the East and East in particular.







can supply any want if only their attention is drawn to it. James Watt, according to the popular view, had only to see the lid of a kettle moving up and down to discover the steam-engine, but, as a matter of fact, he had to study and work very hard before he brought his invention to a successful issue. In concluding his paper, the President said he did not wish in any way to discourage them from trying their hand at inventing, but to impress upon them the necessity of making themselves thoroughly acquainted both with natural laws and existing practice. They could not master their subject without careful study and hard work, but if they devoted their time to the acquisition of knowledge they would be well fitted to contribute their share to the progress of engineering. The usual vote of thanks was subsequently accorded to the President.

### Illustrations.

#### DESIGN FOR A BANQUETING HALL.

**T**HE chimney-piece in this design is of alabaster principally, with bronze capitals to the columns, and panels of mosaic in the arcade above, showing figures bringing the produce of the earth for the use of mankind.

The inlaid Italian walnut panelling, 6 ft. 6 in. high, is divided by pilasters—pedestals supporting statuettes emblematic of the different parts of the globe, and of Industry, Abundance, and Peace, of Music, Song, and Dancing.

On the wall space above are paintings in "spirit fresco," that on the left representing Triptolemus, who, having travelled the earth teaching the inhabitants legislation and how to sow corn and make bread, returned in triumph to Eleusis and established the festivals there in honour of Ceres.

On the right the subject is the Dionysia established by Bacchus, who taught the people the use of the vine, and cultivation of the earth with oxen.

He instituted this festival in commemoration of his Indian expedition.

Above this a large cove decorated with painted arabesques leads to the panelled ceiling of modelled plaster, slightly tinted and heightened here and there with gold and colour.

The design, by Mr. W. F. Randall, occupied a prominent position in the Architectural Room at the last Royal Academy Exhibition.

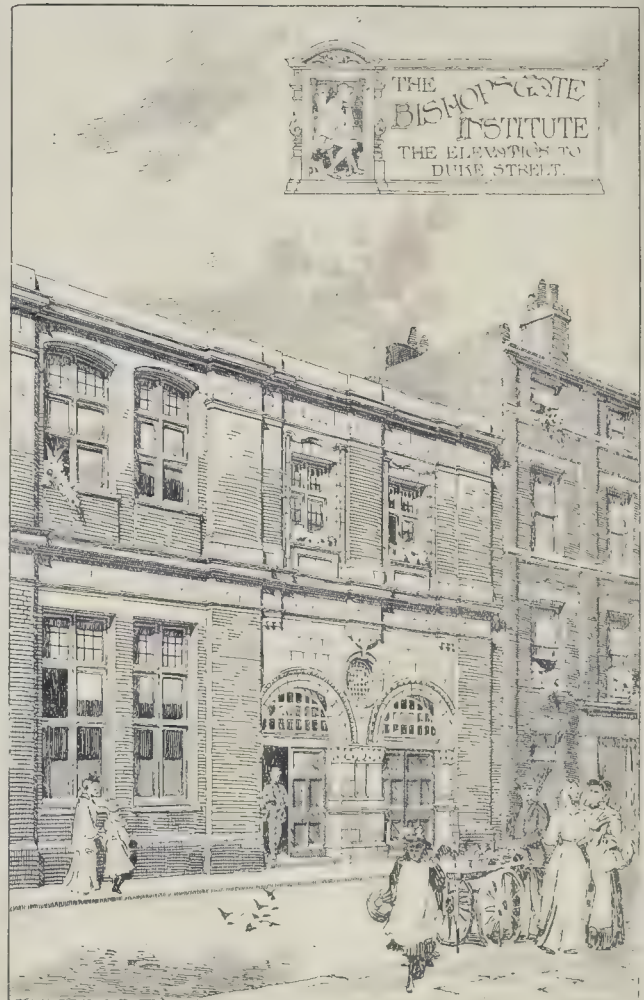
#### NEW INSTITUTE, BISHOPSGATE.

THE scheme prepared in 1891 by the Charity Commissioners for administering the charities of the parish of St. Botolph, Bishopsgate, included the "providing and equipping an Institute and branches in connexion therewith," and we illustrate this week the building (close on completion, and to be opened by Lord Rosebery to-day, Saturday) which has in consequence been erected by the Governors of the Bishopsgate Foundation.

The site purchased with the sanction of the Commissioners is one that offered considerable difficulties to the architect. The block plan will show that, with a narrow frontage to Bishopsgate, it extends in an irregularly-shaped figure of an extreme length of 273 ft. from that street on the west, to Duke-street on the east, with a third frontage in Brushfield-street. With the exception of these comparatively small openings on to streets, the whole of the site is surrounded with property, principally of the warehouse and manufactory class. The fact that all these buildings could claim rights of ancient lights and air, and that the old premises removed for the Institute were in great part only of one story, will indicate that great care was necessary in arranging the new building so as not only to avoid infringing any of those rights, but to satisfy the many co-owners of the adjoining party-walls. Indeed, in connexion with the latter, no less than thirty-four "party-wall notices under the Act" were served at the commencement of the work.

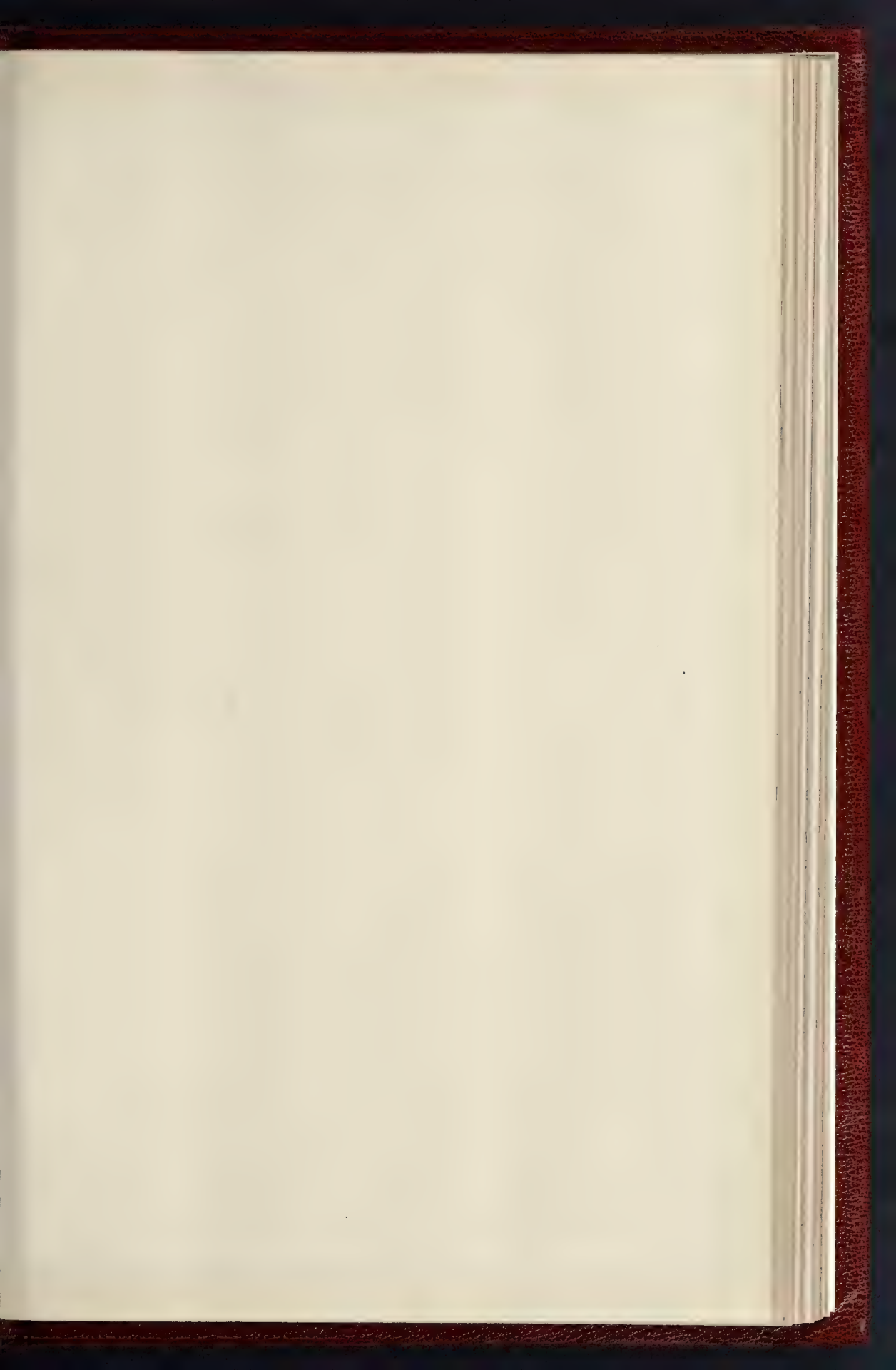
The plans indicate without need of much explanation the arrangement of the Institute, which is intended to provide that crowded part of the City with a public library and a hall for meetings, concerts, picture-exhibitions, &c. It was not deemed expedient that the scheme should arrange accommodation for technical education.

With a view to obtaining greater quiet the library has been planned on that portion of the site furthest from the crowded thoroughfare of Bishopsgate, but access is gained to it not only from Duke-street (on which it faces), but from Brushfield-street and Bishopsgate. It is possible



— PLAN OF SITE. —  
SCALE OF FEET 0 10 20 30 40 50 60 70 80 90 100







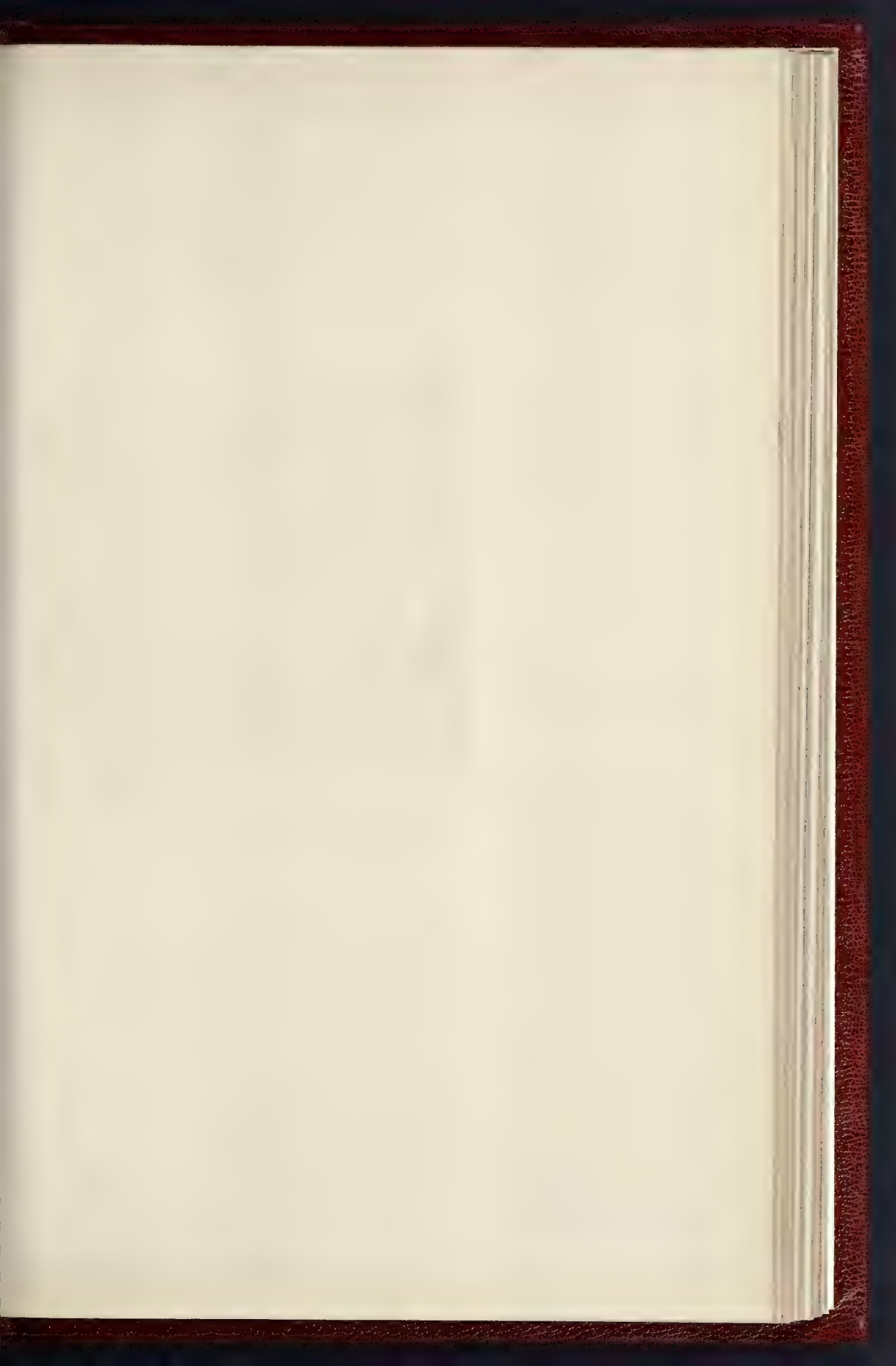




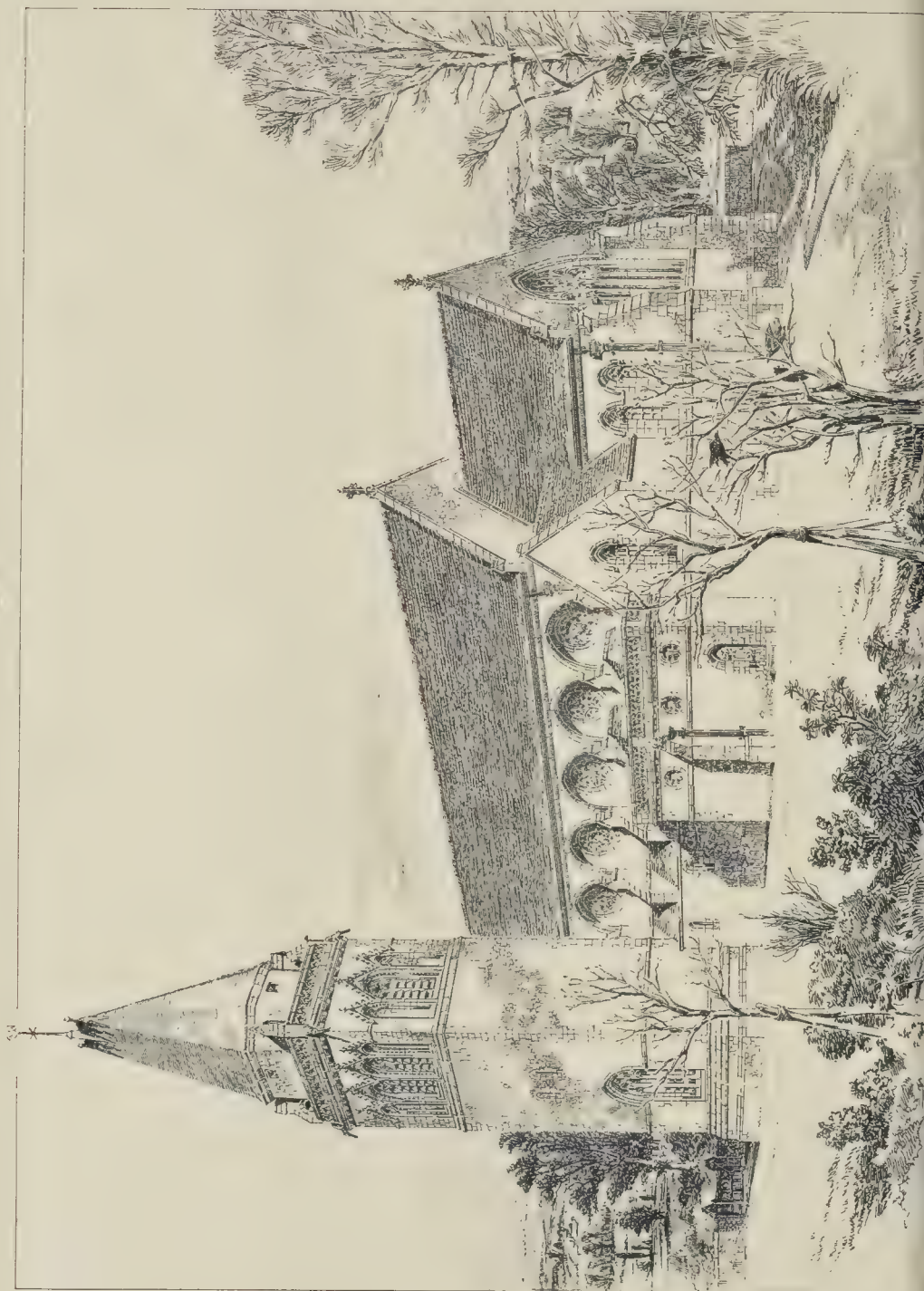
DESIGN SHOWING PORTION OF A BANQUETING HALL. BY MR. W. F. RANDALL.



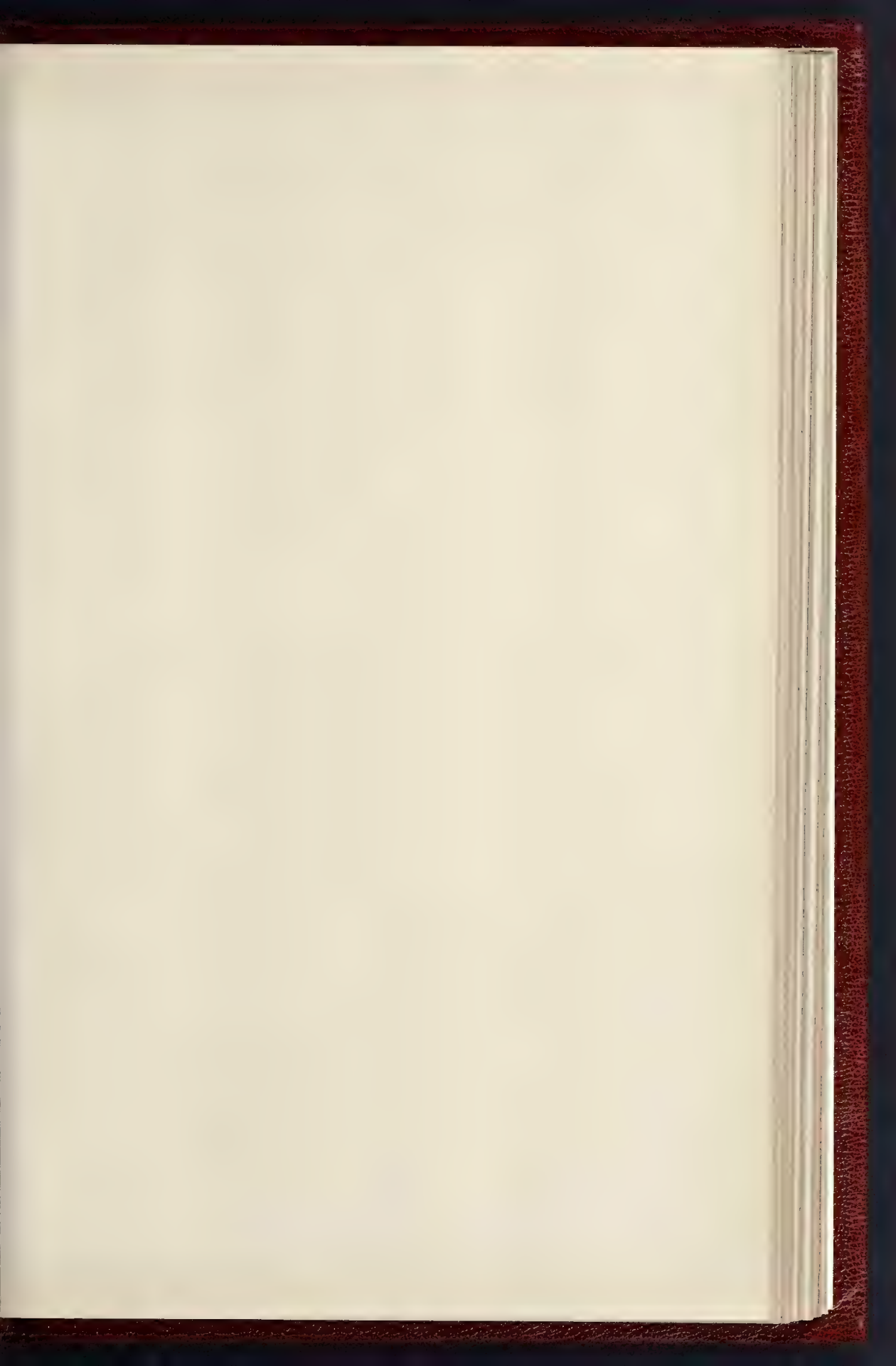




THE BUILDER, NOVEMBER 24, 1894.





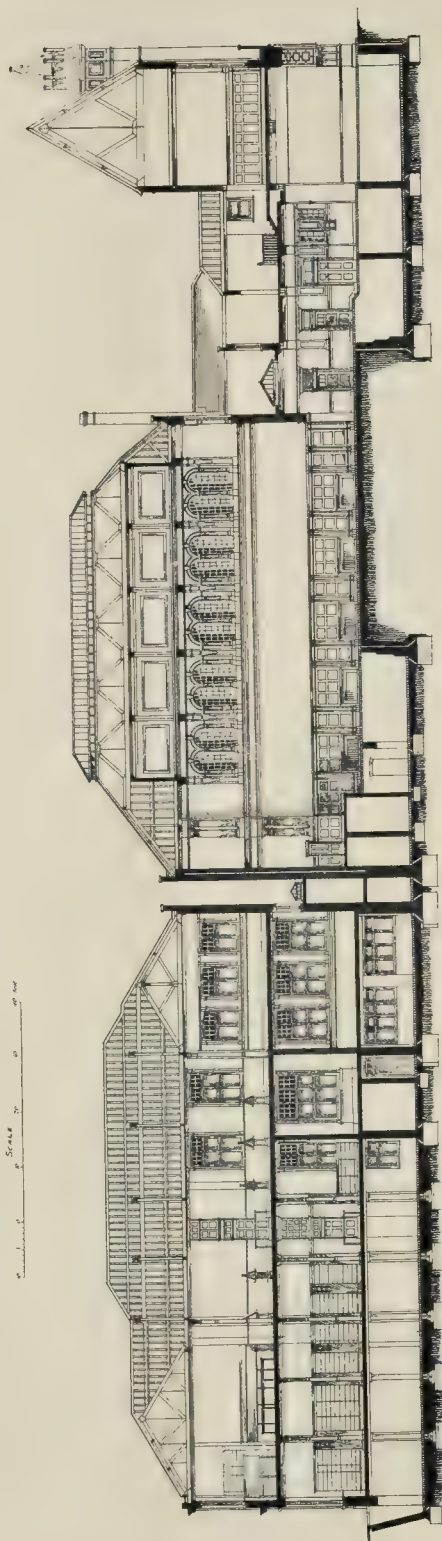


THE BUILDER, NOVEMBER 24, 1894.

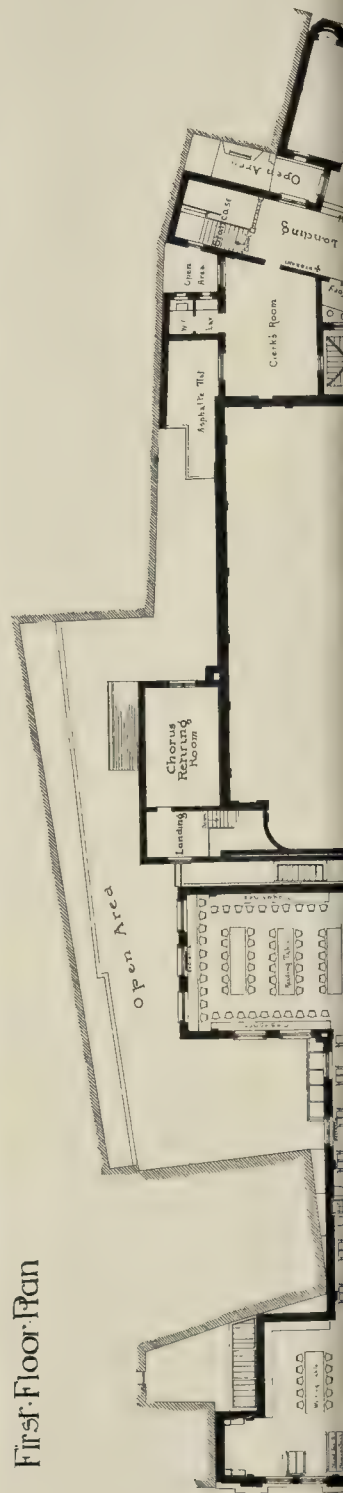
# Bishopsgate Foundation New Institute.

LONGITUDINAL SECTION.

Scale 1/4" = 1' 0"



First Floor Plan



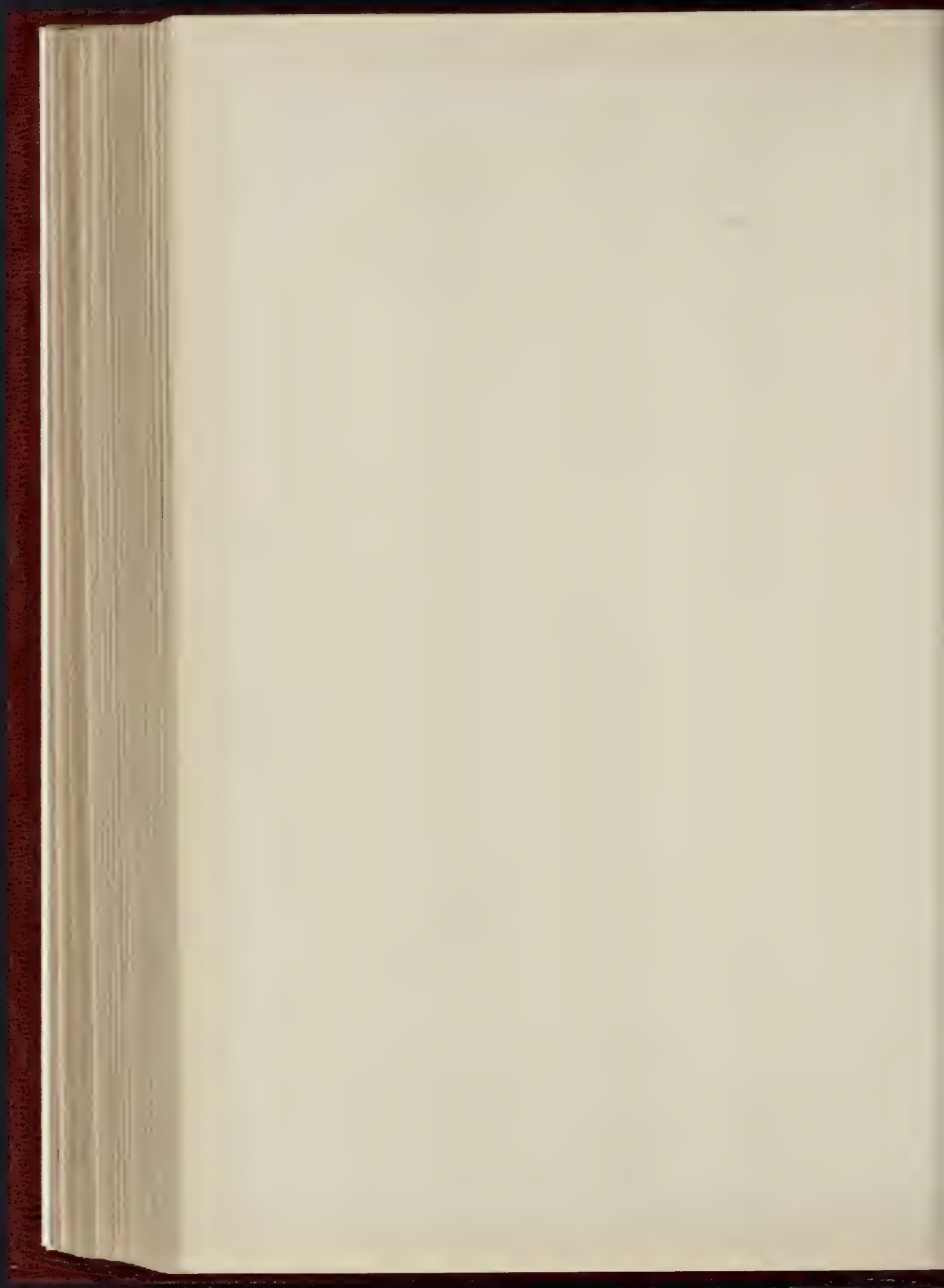




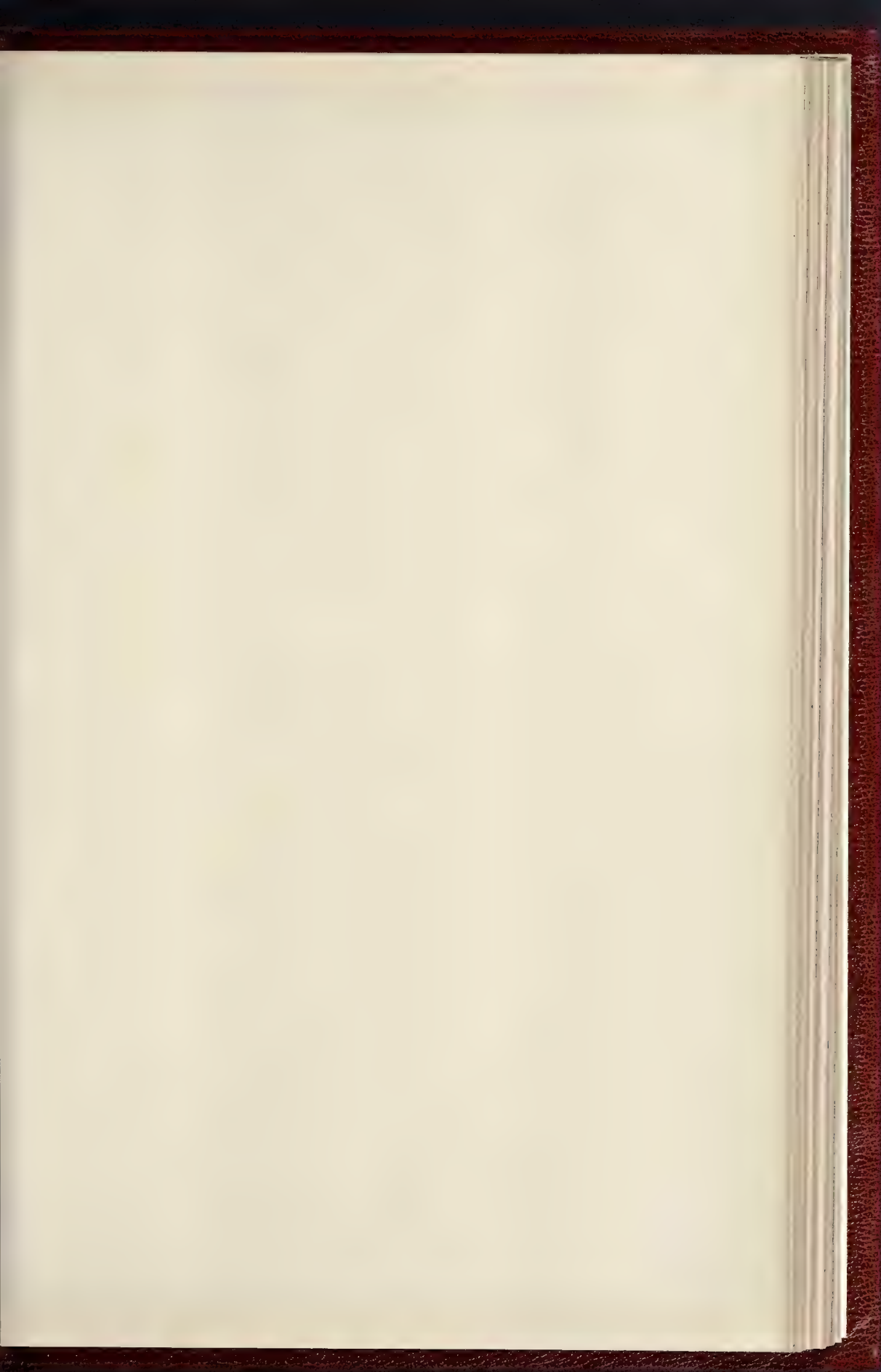
Ground Floor Plan

Charrison Townsend  
Architect  
FRIBA

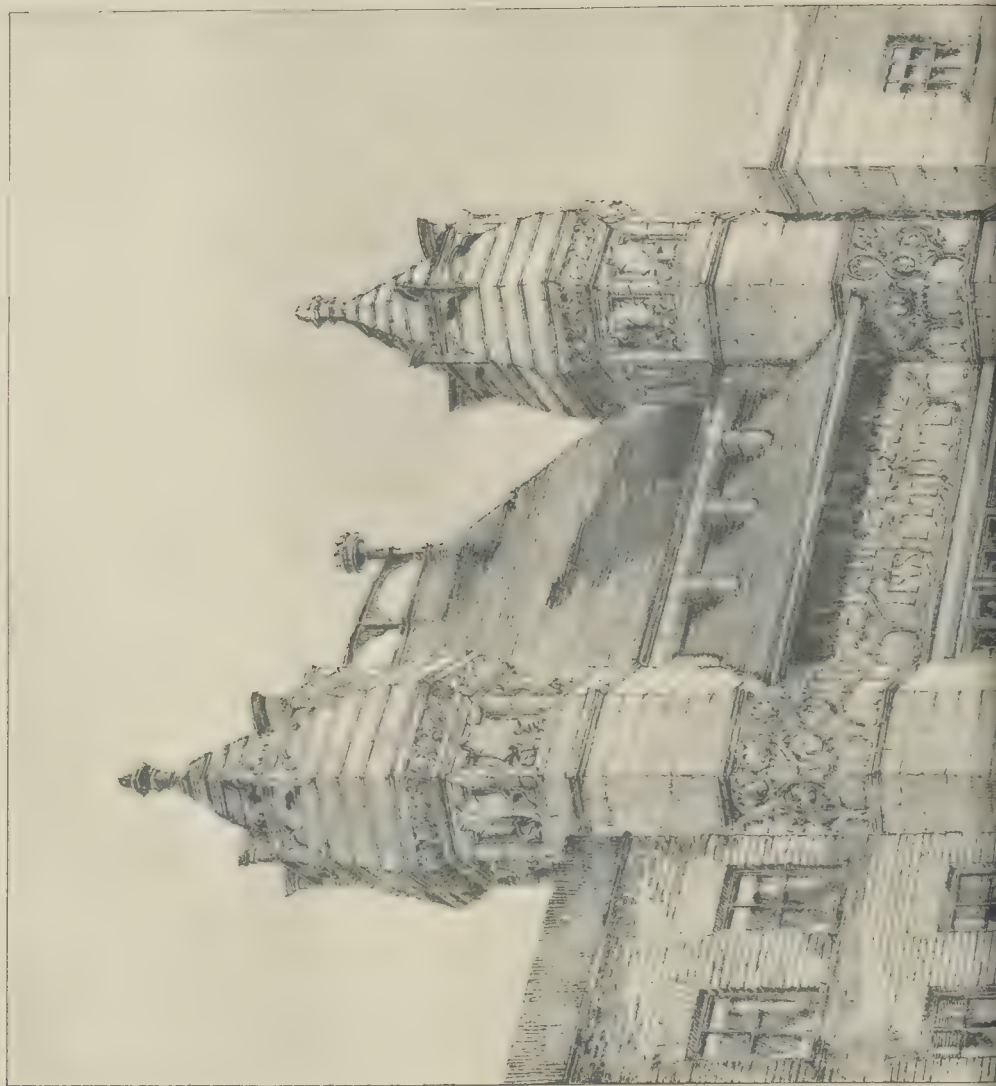
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THE BUILDER NOVEMBER 24 1894



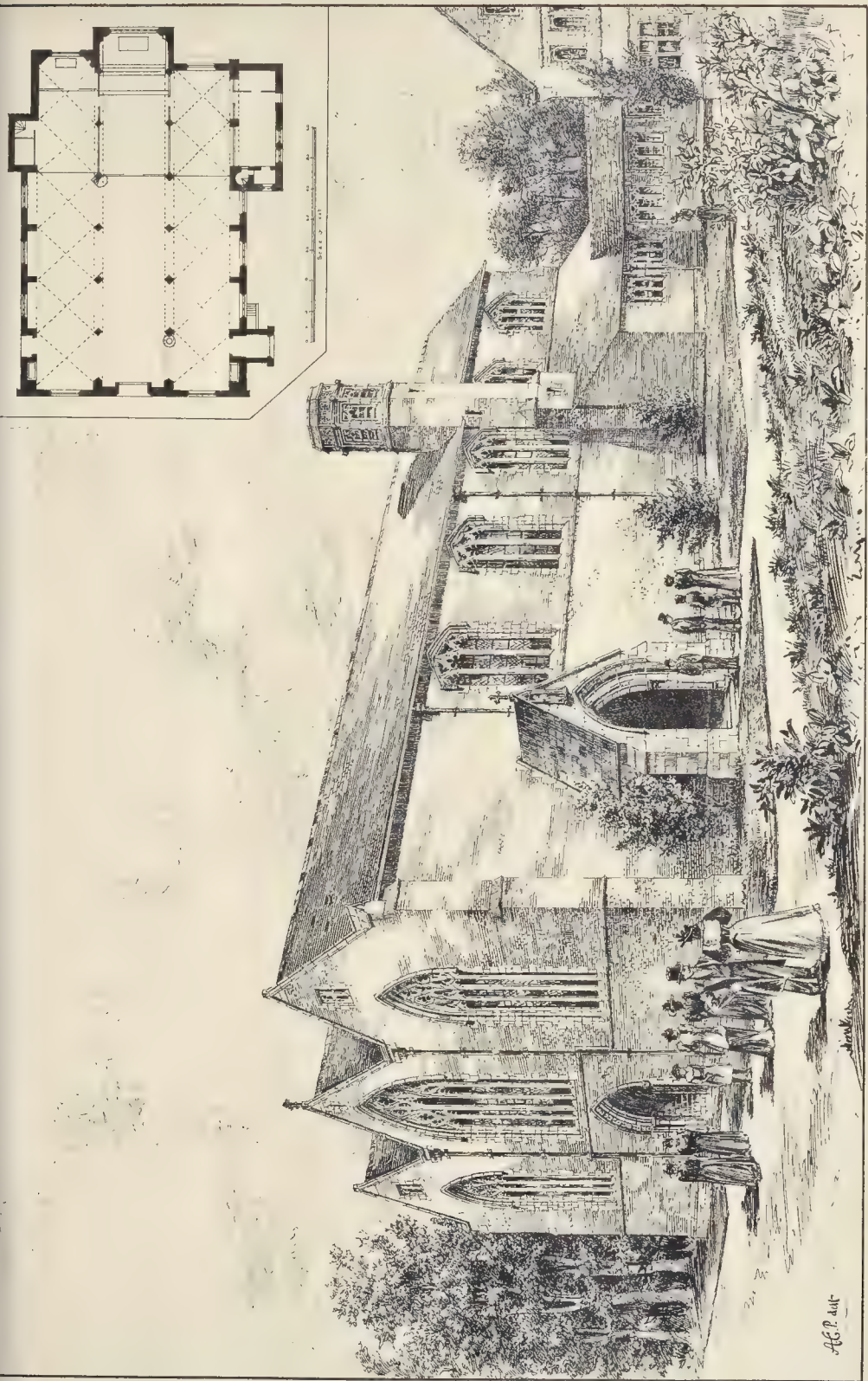




THE BISHOPSGATE INSTITUTE PRINCIPAL ENTRANCE FRONT. MR. C. HARRISON TOWNSEND, F.R.I.B.A., ARCHT.







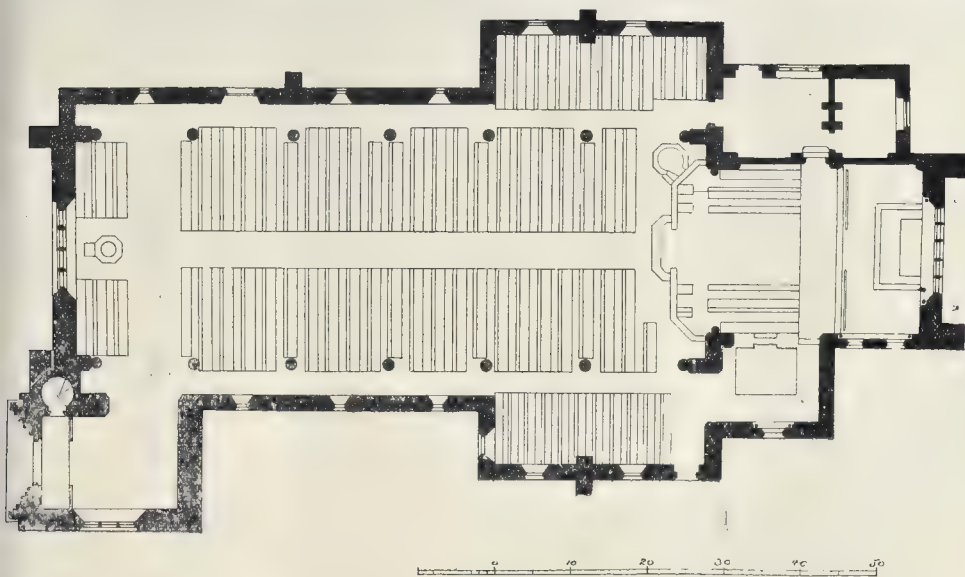
ST. JOHN'S CHURCH, HENDON.—MR. TEMPLE L. MOORE, ARCHITECT.

A.P. del.

PHOTOGRAPH BY MR. C. 413, EAST HENDON STREET, HENDON, E.C.







St. Peter's, Bushey Heath.—Plan.

at the hall will be used in connexion with the library as a reading-room or "common-room."

Attention may be called to the fact that the reading-library (as a glance at the disposition of the fittings will show), is arranged for a system of working that is unusual, but which is pronounced to be a successful one in those tentative cases where it has been adopted. If its results here answer the expectations of the librarian as fully as he expects, the new principle is likely to effect radical change in the method by which lending-libraries are worked, and so to be of interest to architects who have to deal with such buildings.

The place of the old and somewhat cumbersome method of consultation of catalogue and register, one which tells hardly on the borrower whose name is not stored with many names of books - the public is (subject to proper watching), to be permitted to have access to the book-shelves, and select from them the particular book wanted.

Attendants, placed at the two turnstiles near the transe, check and register the borrower and his book. Of course, supervision of a constant character is arranged for, but it is hoped that this will be lightened by the wish, and that each visitor will be interested in checking abuses.

The lending library is now being fitted with shelving for 20,000 volumes, but accommodation for a larger number can be found both here and the reference library, which is arranged at present for 10,000 volumes. The basement, which is well lighted, finds storage for a considerable number more, and labelling and book-binding workshops are provided here, as well as certain staff-rooms.

The reading-room on the first-floor accommodates about 200 readers. The arrangement of the fittings (which are in walnut, those on the ground-floor being in English oak) will be understood by reference to the plan.

As is shown, one portion of this room is arranged for women readers, but after due consideration no separate reading-room for boys is provided. The stairs to the library portion and the board-room in Bishopsgate are of solid oak. The walls of the corridors (which, in compliance with the provisions of the London County Council, have in no case any projection of pipes, &c.) and of the staircases are lined with tiles, and the floors of the former and of the vestibules of marble mosaic set in red cement. The floors of both library and hall are laid with standard patent oak-block flooring, and are of fireproof construction, upon Messrs. Homan & Co.'s system.

The heating system is that of Messrs. Ashwell Nesbitt. The fresh air entering at the back of radiators, shown on the plans, is delivered into the rooms adequately warmed. Two Trentham

Cornish boilers in the basement serve as occasion requires for the heating of either the library or the hall or both.

The foul air is carried away from the library by a system of exhaust flues fitted with gas-jets.

The hall, 80 ft. long by 40 ft. wide, will seat 520 people. The exit doors (all of them 10 ft. wide) open so immediately on to thoroughfares that there is little doubt but that the whole of the audience could, in case of panic, find its way out of the building in an exceptionally short time. With a view to its being used for the occasional purpose of a picture-gallery, a top light is provided in addition to the high clearstory windows. It is intended that the platform end shall be occupied by an organ, for which Dr. Martin, organist of St. Paul's, has been asked to write a specification, and which will probably be one of the largest instruments in the City.

The principal elevation—that to Bishopsgate—is carried out in light yellow terra-cotta from the works of Messrs. Gibbs & Canning, at Tamworth, the modelled work having been executed by Mr. W. Aumonier. The two less-important fronts are of red bricks, with dressings of terra-cotta. The mosaic floors were laid by Messrs. Mainzer & Farrar, and the tiling to the walls of the corridors, &c., by Messrs. Maw & Co. The electric-lighting has been carried out by Mr. A. H. Wood, of Westminster, the fittings having been supplied by Messrs. Verity & Sons, of Covent Garden. The whole of the library stands, tables, chairs, and other fittings were made to special designs by Messrs. Lascelles & Co., of Bunhill-row.

On the failure of the contractor during the early part of the work, it was resumed by Messrs. John Mowlem & Co., Mr. T. Lee representing the Governors' interests as clerk-of-works. The architect is Mr. C. Harrison Townsend.

#### ST. PETER'S CHURCH, BUSHEY HEATH, HERTFORDSHIRE.

The drawing from which our illustration is taken was exhibited in this year's Royal Academy Exhibition. It shows the new nave and tower to be built in connexion with the eastern portions of the church, which were illustrated and described by us a year ago. The pulpit (also exhibited in this year's Royal Academy) was illustrated in the *Builder* of April 21 last.

Messrs. Norris & Sons, of Sunningdale, are the contractors. The architect is Mr. James Neale, F.S.A., of London.

#### ST. JOHN'S, HENDON.

The church is to be built in the Decorated style, and is to consist of nave and chancel under an unbroken roof, with north and south aisles

extending nearly the whole length of the church. The nave is to have a waggon roof, and the aisles are to be groined in wood.

The north chancel aisle will serve as a morning chapel, and the organ is to be placed in a chamber on the north side of the chapel.

The vestries are on the south side of the church, and these, as represented in the sketch, are to be connected with the vicarage by a cloister.

The building is to be faced externally with stock brick, with stone window tracery and dressings, and the roof to be covered with red tiles.

Mr. Temple L. Moore is the architect.

#### THE BUILDERS' BENEVOLENT INSTITUTION:

##### ANNUAL DINNER.

The forty-seventh annual dinner in aid of the funds of this Institution was held on the 15th inst. at Carpenters' Hall, London Wall. Mr. Basil P. Ellis, the President of the Institution, occupied the chair, and was supported by Sir J. Whittaker Ellis, Bart., Mr. John Aird, M.P., Mr. Thomas Blashill, F.R.I.B.A., Mr. N. Smith (the Master of the Carpenters' Company), Mr. A. Lucas, Mr. F. J. Dove, Mr. J. Randall, Sir W. Pearson, Bart., Mr. B. E. Nightingale, Mr. H. H. Bartlett, Mr. Howard Colls, Mr. C. Russell, Mr. J. T. Bolding, Mr. J. W. Duffield, Mr. T. Stirling, Mr. W. Shepherd, and Mr. T. Hall.

The Chairman gave the toast of "Her Majesty the Queen, the Prince and Princess of Wales, and the rest of the Royal Family."

Sir J. Whittaker Ellis, Bart., gave "The Army, Navy, and Auxiliary Forces," Major Brutton responding for the Army and Navy, and Mr. J. T. Bolding (late Middlesex Yeomanry) for the Auxiliary Forces.

Sir W. Pearson, Bart., proposed "The Houses of Parliament," which was replied to by Mr. John Aird, M.P.

The Chairman, in proposing the toast of the evening, "Success to the Builders' Benevolent Institution," said it had now been established for nearly half a century, and there was no doubt that, during that long period, much good had been done by the charity. At the present time the Institution paid pensions to forty-eight persons, all of whom, in consequence of old age or infirmity, were unable to earn their own living. The Committee made very careful inquiries before placing anyone on the list for election, and went personally into all these matters. To enable the Committee to pay the pensions, an income of certainly not less than 2,000*l.* a year was required. The investments yielded about 650*l.* a year, which was a great help, but still it would be seen from these figures that a considerable part of the income was derived from annual

subscription and donations. It was generally admitted at the present time that the building trade was depressed, and for that reason, he was sorry to say, some portions of the income of the charity had fallen off; but he hoped, with the hearty assistance they had received from all quarters, and which he gratefully desired to acknowledge in the name of the committee, they would manage, notwithstanding their difficulties, to maintain the Institution on a thoroughly satisfactory financial basis. The charity was very carefully managed; they did not run into debt, and ask their friends to help them out of the difficulty, but they endeavoured to keep within their income. The trade of a master-builder was subject to even greater risks than most trades were. A great item to be considered in making a contract was the question of how much the labour was to cost. It was not generally difficult to state pretty nearly what the material would cost, but the labour was a very open question. He believed those who were his elders would admit that it was more difficult than it was twenty years ago to make an estimate as to what the labour would cost in any particular contract. There was all the more reason then why this Institution should be well supported. Builders might be well up to their work, but through circumstances over which they had no control, it happened from time to time that they lost a great deal of money, and in consequence of ill-health were not able to get up again. As in other trades, the elder men were gradually going out of business, and younger men coming in, and he hoped they would do all they could to get the younger men to subscribe to this Institution.

Mr. F. J. Dove, who replied, said he had been asked to do so in the regretted absence of Mr. G. Plucknett, one of the staunchest friends of the charity. Builders now-a-days were so keenly alive to cutting one another's throats, that it was a wonder they were not all applicants for the benefits of the Institution.

The President also gave the toast of "The Worshipful Company of Carpenters," to whom they were indebted for the use of the Hall in which they were met, and for their handsome donations to the funds.

The Master of the Carpenters' Company replied, and said that the Company took a great deal of interest in this Institution. The Company had been deprived of a great many of its old functions, but they were doing their best to promote technical education.

Mr. Howard Colls proposed "The President." The toast was very cordially received, and the chairman replied.

Mr. H. H. Bartlett gave "The Architects and Surveyors," and said that from remote antiquity architecture had been one continued progress onwards and upwards, and they could point to works of the present time as being fit to compare with those of the past. The duties of architects and surveyors should be kept separate. The builders were perfectly satisfied with the way in which the London surveyors conducted their work, holding the balance, as they did, between the architect and the builder.

Mr. Thomas Blashill, in replying for the architects, said that one very important point in connexion with the technical education of the young architect, as laid down by their Institute, was the way in which he should conduct himself towards the builder and his clients. He agreed that the duties of the surveyor were not such as should be undertaken by the architect.

Mr. H. Northcroft also replied. He said he felt that the quantity surveyors of London were getting into a better position year by year. He believed they were becoming recognised in a greater degree than before, and as the profession grew in importance London quantities would be used all through the kingdom, the London practice being undoubtedly the best.

Mr. Arthur Lucas proposed "The Vice-Presidents, Committee, and Stewards." He bore testimony to the good work done by those gentlemen, and to the exertions of Major Bruton, their energetic secretary. Mr. G. J. Lough replied to the toast.

In the course of the evening subscriptions and donations to the amount of 966/- were announced, of which 504/- appeared in the President's list. The President further announced that the members of his firm present had agreed to increase their subscriptions so as to make the total amount up to 1,000/-.

APPOINTMENT.—We are informed that Mr. Albert N. Hawtrey, A.M.Inst.C.E. and Assistant-Surveyor to the Vestry of St. Pancras, has been appointed as Engineer and Surveyor to the Shore-ditch Vestry.

## THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

**The Council and its Employés.**—The Parks Committee brought up a report dealing with the question of the Council's servants working for other employers. The Committee stated that they had had before them the cases of certain gardeners in the employment of the Council working for private persons after their day's work for the Council was done. The matter was referred to a Sub-committee, which brought up a report recommending that a standing order should be made to the effect that every officer and workman in the employment of the Council would be expected to devote his whole time to the Council's service, and would not be allowed to take any private business or unpaid employment. After carefully considering the matter, the Committee doubted the expediency of making such a standing order, and accordingly did not see its way to adopt the recommendation of the Sub-committee. The Committee therefore recommended the Council to concur in this view.

Mr. Crooks moved an amendment to the effect that every officer and workman in the employment of the Council should devote his whole time to its service, and should not be allowed to take any private business or paid employment, and that it be referred to the General Purposes Committee to prepare a standing order to that effect.

Mr. J. Stuart seconded the amendment, and after a long discussion it was carried by 51 against 28.

Mr. Arnold then moved that the words "and should not be allowed to take any private business or paid employment" be struck out.

This was seconded by Lord Welby, but was lost.

Mr. Orsman moved that after the word "employment" the following words be added "of the same character as that in which he is employed by the London County Council."

Lord Monkswell seconded the amendment, which was lost, upon a division, by 2.

Mr. Campbell moved, and Mr. Fletcher seconded, that the matter be referred back to the General Purposes Committee. This was also lost, and Mr. Crooks' amendment was then carried as a substantive motion.

**Rebuilding of Vauxhall Bridge.**—The adjourned report of the Parliamentary Committee contained the following paragraph, the recommendation being agreed to:—

"In pursuance of the resolution of the Council on March 16, 1894, we have prepared a Bill to be introduced in the Session of 1895, to authorise the rebuilding of Vauxhall Bridge. The provisions of the Bill, which have been approved by the Bridges Committee, are similar to those in the Bill previously introduced by the Council, and we have consequently not thought it necessary that a copy should be sent to each member of the Council. We recommend—

"That the London County Council (Vauxhall Bridge) Bill in the form in which it has been settled by us, be signified, that the said Council be allowed to affix to a petition for leave to bring in the Bill; and that the Bill and petition be deposited, pursuant to the standing orders of Parliament, with such verbal alterations (if any) in the Bill as the Parliamentary Committee may consider desirable."

**Sanitary Staff of the District of St. Saviour's, Southwark.**—The Report of the Public Control Committee contained the following paragraph:—

"The Mansion House Council on the Dwellings of the Poor having asked the Local Government Board to cause an inquiry to be made into the sanitary condition of the parishes of St. Saviour and Christchurch, Southwark, the Local Government Board suggested that the Mansion House Council should submit to the London County Council the particulars of cases in which they considered the St. Saviour's District Board had made default. The Mansion House Council thereupon, on March 30, 1892, communicated to the London County Council the particulars of certain cases in which in the opinion of the Mansion House Council the District Board had made default, and asked the London County Council to exercise the powers vested in it by sections 100 and 101 of the Public Health (London) Act, 1891. On receipt of this information we instructed the medical officer to report on the sanitary condition and administration of the district. A copy of his report, which was printed and circulated among the members of the Council, was sent to the St. Saviour's District Board with an intimation that we were strongly of opinion that under the circumstances mentioned in the report a larger number of sanitary inspectors should be appointed for the district. After further correspondence we are glad to be able to report that the Board has resolved to appoint an addi-

tional sanitary inspector in compliance with our desire, and also to appoint another sanitary inspector in the place of Mr. S. Broadhead, who has resigned his position."

**London Tramways.**—Mr. Charles Harrison reported that the Parliamentary Committee have prepared a Bill to give effect to the resolution of the Council on July 31 last to apply for powers to work, should it be deemed necessary or expedient, any tramway which it may purchase under the provisions of the Tramways Act, 1870. The Committee have directed a copy of the Bill to be sent to each member of the Council, and the recommended: "That the London Tramways Bill, in the form in which it has been circulated, be approved; that the seal of the Council be affixed to a petition for leave to bring in the Bill; and that the Bill and petition be deposited pursuant to the standing orders of Parliament, with such verbal alterations (if any) in the Bill as the Parliamentary Committee may consider desirable."

This was agreed to without comment.

**The Unification Report.**—A long debate then ensued on the adjourned report of the Special Committee on London Government, dealing with the Unification Report. At seven o'clock the debate was adjourned until next Tuesday.

The Council adjourned at 7.30 o'clock.

## COMPETITIONS.

**SCHOOLS, HARTLEPOOL.**—The competition for a school for 250 boys and 250 girls, in Galleys Field, Hartlepool, has just been decided, with the result that the design submitted by Mr. J. M. Bottomley, 28, Albert-road, Middlesbrough, has been placed first.

## ARCHITECTURAL SOCIETIES.

**NORTHERN ARCHITECTURAL ASSOCIATION.**—The opening meeting of the winter session of the Northern Architectural Association was held on the 14th inst., in the meeting-room of the Art Gallery, Newcastle. The President, Mr. Jos. Oswald, F.R.I.B.A., presided, and the following gentlemen were elected members of the Association:—Member: Mr. Henry Gibson. Associates: Messrs. Hy. C. Creighton and Alf. W. Sarsfield. Students: Messrs. K. Tasker, James F. Russell, and George Adams. The nominations for membership were:—Member: Mr. J. W. Hanson. Associates: Messrs. Harry Barnes, A.R.I.B.A., Sunderland; and John White, A.R.I.B.A. Students: Messrs. W. Shanks, F. R. Laverick, and G. W. Hayler. The President then delivered his inaugural address. He briefly referred to the age and strength of the Association, and the early work connected with it, and explained their relation with the R.I.B.A. He said the Architectural Alliance in name no longer existed, but its place was more than filled by that wider alliance which had been established between the Royal Institute of British Architects and various Societies of Architects throughout the kingdom, fifteen in number. This arrangement, comparatively of recent date, was destined without doubt to confer many benefits upon the provincial branches, and also upon the central Institute, and through them all upon the profession at large. Nine of the societies he had mentioned were represented upon the governing and deliberative body of the Royal Institute in London, in the persons of their Presidents. That Association had the good fortune to be one of the nine so represented, and he had, therefore, the honour, on their behalf, to sit at the Council Board of the R.I.B.A.

**EDINBURGH ARCHITECTURAL ASSOCIATION.**—The Session of the Edinburgh Architectural Association was inaugurated on the 14th inst. by a conversation held in the Royal Institution. After tea, the President, Mr. W. W. Robertson, delivered an inaugural address. He called attention to an exhibition of fine old engravings at Edinburgh, and especially of Edinburgh Castle, which had been made by the late Mr. William Nelson. Passing on, he said his attention had been drawn to the recent addition to the Advocates' Library of the manuscript journal of James Playfair, extending over the period from 1783 to 1793. He had read the journal, and found it to be a plain business record of journeys taken, work done, and accounts rendered. A good deal was disclosed that was interesting, glimpses of the habits, the life, and the work of the time, but not, on the surface at least, very much of the man. He explained that James Playfair was the father of the William Henry Playfair, and the brother of the Playfair who had been Professor of Natural



Philosophy in the University of Edinburgh. To them he was interesting as the father of the distinguished architect of Donaldson's Hospital, of the building in which they were then assembled, and of many others which ornamented the city. He was a Scotsman who had emigrated to London and established himself as an architect in Russell-square. Mr. Robertson then quoted freely from the journal, beginning with business entries. Perhaps to them the most interesting part of the journal was the mention of Playfair's journeys to Scotland every year. In successive visits the same names appeared and reappeared—Dalkeith Palace, Melville Castle, Bothwell Castle, and others. At the close of his address Mr. Robertson was, on the motion of Mr. Balfour Paul, accorded a very hearty vote of thanks. Thereafter, there was an exhibition of lantern pictures, illustrating examples of the Medieval architecture of France and Britain.

**ARCHITECTURAL SECTION, GLASGOW PHILOSOPHICAL SOCIETY.**—The opening meeting of the Session of the Glasgow Philosophical Society was held on Monday, when Mr. T. L. Watson, F.R.S.E., delivered a lecture on "Glimpses of Four Great Periods of Italian Art." The four periods referred to were—(1) That of ancient Rome; (2) the Byzantine period; (3) the Middle Ages; and (4) the Renaissance. The lecturer dealt chiefly with the art of the Middle Ages, and pointed out some of the varieties of Gothic architecture that prevailed in the different divisions of the country. The influence of the Classical art of antiquity was felt throughout the whole Gothic period, and was seen in the general effect of breadth, in the horizontal treatment and the flat surfaces as opposed to the vertical treatment and the deeply-recessed openings and mouldings of Northern Gothic. It was seen again in the fondness for the single round pillar or shaft, often tapered, instead of the clustered pillar. It was particularly observable in the sculpture both of foliage and of the human figure, and in the use of round arches along with pointed ones. There was a certain defect of the constructive sense seen in the apparent overloading of slender pillars, as well as in the prevalence of iron tie-rods to maintain the arches. A third characteristic was the great wealth of colour produced by various marbles, brick and terra-cotta, and by mosaics and fresco paintings. Many of the painters were architects also, and even those who were not showed an intimate knowledge of architecture. The paintings were really allied to the buildings, and not merely applied. The architecture painted as accessory to the figures was in harmony with the lines of the building, and the figure-subjects also had the architectural qualities of symmetry, restraint, and repose. The architecture, painting, and sculpture of the Renaissance were then touched upon, and the same qualities were illustrated up to the middle of the sixteenth century, after which there was rapid deterioration. In the course of the lecture limelight views were shown, among others being works of the Pisanos, the Della Robbia's, Donatello, Ghiberti, and Della Quercia in sculpture; and Giotto, Fra Angelico, Benozzo Gozzoli, Filippo Lippi, Ghirlandajo, Raphael, and Andrea del Sarto in painting, as well as many buildings and architectural details.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—The third lecture of the winter series of this Association was delivered on Tuesday evening, in the rooms, 114, West Campbell-street, by Mr. James Chalmers, I.A., the subject being "Egyptian Art." Mr. W. Tait Conner, A.R.I.B.A., occupied the chair. After some introductory remarks dealing with the historical and geographical side of the subject, the lecturer spoke at some length of the nature of the materials employed by the ancient Egyptians, and explained the various theories held by authorities as to the methods of quarrying and transport of the huge blocks of stone. Views were shown by limelight of many notable ancient buildings, the lecturer describing in detail the chief points of interest.

**LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.**—On the 12th inst., at the opening meeting of the present session of the Leeds and Yorkshire Architectural Society, Mr. E. J. Dodgshun delivered the Presidential address. We may be able to devote some space to the President's remarks in our next issue.

#### ENGINEERING SOCIETIES.

**INSTITUTION OF CIVIL ENGINEERS.**—At the ordinary meeting of this Institution on the 20th inst., Sir Robert Rawlinson, K.C.B., the

President, in the chair, the paper read was on "The Machinery of War-Ships," by Mr. Albert J. Durston, Engineer-in-Chief of the Navy.

**CIVIL AND MECHANICAL ENGINEERS' SOCIETY.**—The Civil and Mechanical Engineers' Society visited, on the 15th inst., the works of Messrs. Bullivant & Co., in the Isle of Dogs, where the processes of making steel wire cables and ropes, torpedo-catching nets, and wire-netting is carried on. The members of the society were taken over the works by one of the partners; they were shown every detail of the manufactures, from the testing of the wires before they are made up into ropes, to the testing of a finished heavy cable. The various machines in the cable-shop were carefully explained, as was also the process of galvanising the wires. A hearty vote of thanks was given to Messrs. Bullivant & Co. Among those present were:—The President, T. C. Walrond, C.E., the Hon. Sec., E. H. G. Brewster, C.E., M.Inst.M.E., the Treasurer, A. A. Myall, C.E., A. Wollheim, C.E., C. J. Brown, C.E., W. C. Penn, A.M.Inst.M.E., H. Coward, C.E., A. K. Stothert, A. H. Anderson, H. A. Monsfield.

### Correspondence.

To the Editor of THE BUILDER.

#### CONTINENTAL SANITATION.

SIR,—The yearly-increasing number of English tourists that now pass through or make a sojourn at Dieppe—especially during the summer months—will, I feel assured, be glad to know that every attention is being paid by the municipal authorities there to questions connected with sanitary improvement.

I have before me a very interesting and able report, recently issued, from the pen of an eminent *avocat*, deputy mayor and sanitarian, who has been decorated for his services to the public health, Monsieur Coche, a report which treats of the operations of a local "Commission" that has been sitting since 1892 at Dieppe, to inquire into and report upon the subject of insanitary dwellings. The "Commission," of which M. Coche is the chairman and which has been constituted in the usual French way—i.e., half composed of experts, the other half of representative citizens—has acted in co-operation with the "Comité Consultatif d'Hygiène Publique de France," a body called into being by a decree of the Second Republic (1848) and on which sit such men as Professor Brouardel, Drs. Du Mesnil and Proust, whose guidance and energetic initiative have enabled the Dieppe "Commission" to undertake work of a more specific character than that previously attempted by them. The report shows that, out of the cases dealt with, 45 per cent. have been satisfactorily disposed of, and that the remainder are in process of being carried out, whilst in six cases only has it been necessary to have recourse to the powers of the Municipal Authority.

M. Coche goes on to touch, with commendable precision, on the difficulties arising from the 1850 law "difficulties of a character so familiar to all of us in this country who have had any experience on Sanitary Boards and otherwise. But it is gratifying to learn that, on the whole, both owners and occupiers have in many cases quickly responded to the wishes of the "Commission," and recognised that that body were acting in the best interests of the community generally. M. Coche concludes by making certain recommendations for the amendment of the 1850 *loi*, and boldly proposes that "the civil tribunals should, throughout France, be substituted for the Councils of Préfecture, so as to secure to municipalities like their own the advantage of utilising the provisions of the Summary Procedure Code." He also suggests that such "Commissions" should be authorised to make compulsory and periodical inspections ("visites"), a fact which shows how far England has progressed beyond her Continental neighbours—a fact, too, generously admitted by M. Coche in a letter from him I have just received since my return from a lengthened stay in the Seine-Inférieure Département. He says:—

"It is a real pleasure to me to forward you copy of my recent report, addressed to the Comité Consultatif d'Hygiène Publique de France, on the labours of my 'Commission' in respect of such insanitary dwellings as still exist in Dieppe. I have thrown myself into this work—a work I admit not very widely taken up, as one reaps from it but little gratitude for one's pains—believing, however, as I do, that in the future it will yield substantial results, as well from the point of view of hygiene as of a

healthy life—as, what I think more important, on moral grounds. As to the former point of view, the best scientific opinion of the day leaves us in no possible doubt as to the right course of action to pursue—and here I am bound to say that you in England are in advance of us by a generation—whilst, with reference to the other consideration—of moral standpoint—there can equally be no question that the worker or the citizen in any capacity who shows a predilection for and acquires a clean and healthy home becomes *ipso facto* a better man.

It is the results obtained in your country, with a rate of mortality as low in some districts as 11 per thousand, which—I will not conceal from you—originally induced me to apply myself to the serious study of these hygienic questions, and especially with a view to diminishing the preventable diseases to which children so readily fall a prey.

We have at present in France only seven towns where a "Commission" similar to the one in operation here is to be found; and we have every reason to be confident that under the guiding hand of the *Comité Consultatif* to which I have referred, a very material progress will before long manifest itself. Eminent men such as Docteurs Brouardel, du Mesnil, and Proust, are devoting their best talents and their zeal for the public welfare to the work; and our town of Dieppe in particular is proud of the position to which it has admittedly attained, of being in the vanguard of the movement.

The above letter, coming from one so intimately associated with an important municipality like that of Dieppe, may perhaps convince some who are a little impatient at the slow progress which is being made on the Continent towards the realisation of our high sanitary ideals, that the matter is not being lost sight of by foreign sanitarians—even if due allowance is made, as I submit it should be, for varying methods of canalisation, and different modes of life that obtain abroad.

CHARLES HANCOCK.

#### THE WARMING OF THE NATIONAL GALLERY.

SIR,—May I be permitted to make a suggestion in regard to recent correspondence in some of the daily papers as to the deterioration of those of the National Gallery pictures in which asphaltum has been used? As to these it is stated that the opinion of scientific chemists is, "all hope is vain, nothing can save them."

The complaint of this impairment appears to be of comparatively modern origin, and not made prior to the introduction into the galleries of the modern scientific system of warming by hot-water pipes or other method of air-heating.

It is agreed that the damage is the result of excessive dryness of the air, caused by the system of warming, which dryness cannot be effectively ameliorated by the usual antidote of water-troughs. These troughs, says Sir Charles Robinson, have been tried at Buckingham Palace and have failed; "the Wilkies so treated there, ran all the same."

It is a difficult and slow process to raise the temperature of air by radiated heat. The warming of air by hot-water or steam pipes is effected much more rapidly by convection. The dryness of air, as we usually speak of it, is not a question of its actual hygrometric condition, nor the actual amount of water-vapour contained in it, but rather of its capacity to absorb more moisture. The capacity of air to absorb water depends largely on, and increases with, its temperature. Air may be effectively dried by extracting its heat, yet it may not be dry in the colloquial sense, because, while remaining at the lower temperature, it is not capable of drying up or absorbing moisture. On the other hand, when air is warmed it is not necessarily made really drier; it loses none of its moisture, but becomes capable of absorbing yet more moisture, and so has the capacity of drying objects in contact with it.

Applying these well-known facts to the pictures, it is apparent that they are subjected to the drying effect of warmed air. The remedy appears to me to consist in reverting to warming by radiation only, by which the air would remain cool, with less capacity for drying the pictures, and, at the same time, would be healthier to breathe. The necessary warmth for the comfort of visitors could be obtained directly by radiation, as from an open fire in ordinary dwellings, where nothing is more pleasant than a good fire in a room recently thoroughly flushed out with cold air.

I presume that at one time the galleries were warmed, if warmed at all, by open fires. If so, it would be useful to inquire whether the same cause of complaint existed then. Be that as it may, it is quite certain that open fires are not to be thought of now. The risk of a conflagration and the large amount of dust which they cause, would be a sufficient bar to their use. But why could not hot-water or steam radiators of sufficient area be applied (not necessarily in the form of pipes) so that the heat should be radiated into the room, whilst that portion of the air which would be heated by contact with the radiators should be immediately removed by flues? This would give the same beneficial result as warming by open fires, viz., comfort to the bodies of the visitors and cool air with but little capacity for absorbing moisture (low drying power).



for the benefit of the pictures and the health of the visitors.

There must be many places in the country where asphaltum pictures have been preserved, and where no hot-water warming has been used. It would be interesting to make adequate inquiry, and to compare the state of the paintings in these places with those in the National Gallery.

ARTHUR HARSTON.

#### OLD IRON-WORK IN BOW CHURCH.

SIR,—In the crypt of Bow Church, Cheapside, there lies neglected and rusting a quantity of fine seventeenth-century iron-work, amongst which I have noticed:—

(1.) A tall and elaborate wrought-iron hat-stand, in character not unlike the mace-stands still common in the City churches.

(2.) The iron railings formerly enclosing one of the monuments in the church.

(3.) An elegant and slightly-elaborated iron corona chandelier, formerly hanging in the ringing chamber.

(4.) Miscellaneous iron-work, the original use of which I was not at a glance able to determine.

This iron-work, most of which seems to be contemporary with the church, is now suffering severely from damp, and will, in a few years, probably become entirely ruined.

The original font designed by Wren, and charmingly wrought in marble, has been bestowed in another corner of the crypt and is in good condition, though it lies in a place where it must frequently be liable to accident. The font-cover belonging to it is now in the vestry. At the "restoration" effected some years ago this font and its cover, hallowed by long use, were mercilessly removed, and a new stone font with "Medieval" brass and wood cover substituted.

The upper part of the reredos, a pediment with candelabra, was at the same time taken away to show the glass in the east window, and is, I am told, still in existence.

The marble and stone pavement which was then replaced with "tessellated tiles" now lies in the crypt.

Surely most of these interesting and original fittings of Wren's fine church might be replaced in their proper positions, or at least the ironwork might be cleaned of rust, painted, and kept in a dry place.

If this were impossible, it would even seem better that they should be removed to some other church or to some museum, where, at any rate, they would be appreciated and cared for, than that they should be left much longer to rot where they now are.

C. A. N.

#### WOOD-PAVING IN STREETS.

SIR,—Your notice of the Report upon the relative merits of cement and pitch for filling the interstices leads me to ask if any such report has been made with reference to the carbolineum, which, so far as my own experience goes, would be much preferable to either. It is of a wonderfully *penetrating* nature, and, although it is best to apply it to a dry material, the wet will not affect it when applied, and, being antiseptic, it has great preservative properties. I believe it has been applied to this purpose, but I do not know if any result of it has been published.

WILLIAM WHITE, F.S.A.

#### WORKS BY THE LONDON COUNTY COUNCIL.

SIR,—With reference to your report of the proceedings at the County Council and statement of cost of works executed by the Works Department, it would be interesting to know whether the amounts therein given include the expenses of the following matters:—

1. Cost of drawings.
2. Cost of quantities.
3. Cost of first estimate by Architectural Department.
4. Cost of second estimate by Works Department.
5. Cost of measuring variations.
6. Cost of superintendence by the Works Department.
7. Cost of Plant.

M.

#### THE EDUCATION OF WORKING MEN.

SIR,—I see in your last issue a list of the organisations from which deputies are invited to a conference on the above subject, a most laudable one, and which should be as representative as possible; but why are the "Clerks of Works Association," the "Builders' Foremen and Clerks of Works Society," and the "Free Labour Society," left out from the list of those invited? Surely the members of the former associations would add a great deal of interest to the conference, as I consider no one comes more in direct contact with the workman, and can better discriminate between good and bad workmanship, and give the cause of either, than the clerk of works or foreman. For the conference to be a success the basis should be as wide and unrestricted as possible.

A GENERAL FOREMAN.

\* We quite agree with our correspondent.—ED.

### The Student's Column.

#### DETAILS OF RURAL WATER SUPPLY.—XXI.

##### WATERWORKS REGULATIONS.

IN accordance with the provisions of the Metropolitan Water Act, 1871, a code of Regulations was compiled by the Metropolitan Waterworks Companies and submitted to the Board of Trade.

These suggested Regulations were subjected to an exhaustive inquiry, and, as finally settled, have been circulated by the Local Government Board for the information of Local Authorities who have obtained the necessary powers, and are preparing to submit Regulations for confirmation. As it is customary for Local Authorities supplying water, and acting only under the provisions of the Public Health Acts, to issue a code of Waterworks Regulations, trusting to their moral suasion and to the popular ignorance of the law for their efficacy (a trust by no means unfounded), a brief commentary upon the Regulations under the Metropolitan Water Act, 1871, is given here. These Regulations are by no means perfect, or are they fitted for all cases. In adapting them for use in rural districts, latitude must be given to many of the provisions, care being taken that the main principles involved are not lost sight of.

No. 1 Gives the company power to determine the point at which the communication-pipe shall enter the premises to be supplied.

No. 2 Requires that all lead pipes in direct communication with the company's system shall be uniform in thickness, and fixes the strength—the weight being taken as the guide.

INTERNAL DIAMETER IN INCHES.	WEIGHT IN LBS. PER YARD.	THICKNESS IN INCHES.	SAFE HEAD OF WATER IN FEET.
1	1.71	1/16	1000
2	6.8	1/8	1875
3	15.4	3/16	2812
4	27.0	1/4	3875
5	41.8	5/16	5000
6	59.7	3/8	6187
7	80.8	7/16	7437
8	105.1	1/2	8750
9	132.6	5/8	10125
10	163.3	3/4	11562

The weight is calculated on a basis of 712 lbs. to the cubic foot, and the strength upon a mean ultimate cohesion of 2,000 lbs. per square inch, allowing a factor of safety of 7 1/2.

The weights adopted by various water companies, as might be expected, vary considerably, on account of the different pressures to which the pipes will be subjected.

The following are the weights, per lineal yard, required by various companies:—

NAME OF COMPANY.	INTERNAL DIAMETER OF PIPES IN INCHES.				
	1	2	3	4	5
London Companies	4.6	7.4	10.1	12.8	16.0
Kent	5.0	7.7	10.4	13.1	16.0
West Surrey	4.5	7.0	9.5	12.0	15.0
Cardiff	4.0	6.0	8.0	10.0	12.0
Colne Valley	4.0	6.0	8.0	10.0	12.0
Severn and Trent	4.0	6.0	8.0	10.0	12.0
South Wales	4.0	6.0	8.0	10.0	12.0
Sheffield	4.0	6.0	8.0	10.0	12.0
Market Harborough	4.0	6.0	8.0	10.0	12.0
Glasgow (Loch Katrine)	4.0	6.0	8.0	10.0	12.0

No. 3 Allows the consumer the option of lead, copper, or wrought-iron for internal pipes, except when in contact with the ground, when the company may insist on lead being used.

No. 4 Limits the consumer to one communication-pipe. This is an important regulation.

No. 5 Requires each house supplied by the company to have its own communication-pipe, except in the case of a block of buildings belonging to one owner, who pays the water-rates for them.

It frequently happens in rural districts that the undertakers are asked to allow a communication-pipe to a property to be tapped for the benefit of another property (the respective owners having agreed between themselves). This should never be permitted.

No. 6 Prohibits any communication between the pipes or fittings of any two premises, except in the case provided for in the last Regulation.

No. 7 Provides that the connexion of the communication-pipe with the company's pipes shall be made by the company at the cost of the consumer, the connexion to be made by means of a "sound and suitable brass screwed ferrule or stop-

cock with union," having a clear waterway of no less than that of a 1/2-in. pipe.

No. 8 Requires that every pipe external to the house, including the portions of pipes laid in external walls, shall be of lead; the joints to be "plumbed" or "wiped" joints.

No. 9 Guards against possible pollution to the water in the consumer's pipes, and thence to the water in the company's pipes, from the consumer's pipes being "laid or fixed through, in, or into" any drain, asphalt, &c. Where such drain, asphalt, &c., is in the unavoidable course of the pipe, the pipe must be protected by passing it through a cast-iron pipe or jacket of sufficient length and strength and of proper construction. When the water is turned off from any part of the system, a partial vacuum is formed, and any liquid matter in proximity to a faulty pipe or leaking joint would be sucked into the pipe, and might be the cause of dissemination of disease throughout the whole system.

No. 10 Requires that all pipes laid in open ground shall be laid at a depth of at least 2 ft. 6 in. below the surface, and provides for proper protection against frost in exposed situations. A depth of 2 ft. is frequently inserted in waterworks regulations, which is probably ample in this country.

No. 11 Prohibits any communication between the pipes and any receptacles for rain-water.

No. 12 Provides for the insertion of a "sound and suitable screw-down stop-valve," either at or near the point of entrance of the communication-pipe into the premises, or within the premises, at the option of the consumer. If placed in the ground, such stop-valve to be protected with a proper cover and guard-box.

For the reasons stated in Chap. XX., it is better to have the stop-cock fixed outside, so as to be under the immediate control of the undertakers. The principal objection, from the consumers' point of view, is that it is less accessible in case of burst pipes, or other accidents, and entails the use of a loose key, which is liable to be mislaid.

No. 13 Deals with cisterns, requiring that they shall be made water-tight, properly covered, placed in such a position that they can be easily inspected and cleansed, and that each cistern shall be provided with a sound and suitable "ball-tap" of the valve kind.

It is evident that if a cistern which is filled automatically is unsound, the waste of water must be constant. The provisions as to covering and cleansing allude to the possibility of pollution in a similar manner to that explained in connexion with Reg. No. 6.

No. 14 Prohibits the use of overflow or waste-pipes other than "warning-pipes," to cisterns; and

No. 15 Requires that all "warning-pipes" shall discharge at such a point that any flow may be readily ascertained by the officers of the company. The position of such "warning-pipes" not to be altered without due notice to and the approval of the company.

These regulations are of the greatest importance, and should be strictly enforced. The old practice of allowing overflow pipes to empty directly into the drains was a prolific source of waste. In the case of the ball-tap being out of order, the waste might continue for months before being detected. With a "warning-pipe," which consists of a short pipe passing directly through the wall into the air, with an open mouth, the case is different; any waste is speedily detected, and the inconvenience caused by a constant stream of water flowing down the face of the wall of the house, causes the occupier to take prompt steps to remedy the defect.

No. 16 Prohibits the use of buried or excavated cisterns. Waste from such cisterns would not only be non-apparent, but would be difficult of detection.

No. 17 Forbids the use of wooden receptacles not having proper metallic linings, e.g., water-butts. This regulation has the double object of preventing waste and avoiding pollution.

No. 18 Requires the use of sound and suitable draw-taps, which must be of the "screw-down" kind.

Draw-taps are divided into two classes, "plug-taps" and "screw-down" taps. In plug-taps, the spindle or plug simply revolves in the tap, without rising or falling; a horizontal hole through the plug being made to connect or disconnect the inlet and the outlet to the tap by revolving the plug. This form of tap has no washer. The objections to the plug-tap are two-fold, the most important being the sudden check which is given to the momentum of the body of water behind it, when the tap is closed. An illustration of the enormous strain upon a system caused by the use



of plug-taps is attributed to Mr. A. R. Binnie (the *Builder*, July 7, 1894, p. 3). In this experiment the pressure on a 3-in. pipe, 114 ft. long, and branching off a supply main and furnished at the end with a plug-cock, measuring 0.152 of an inch, was at the branch 120 lbs., and at the open cock itself 20 lbs. On the cock being shut quickly, those pressures were for the moment found increased to 220 lbs. at the branch and 550 lbs. at the cock. The second objection to the plug-tap is its liability to leak, on account of the rapid wear, necessitating the plug being ground, which can only be done by a mechanic.

"Screw-down" taps (fig. 52, Chap. XX.) have a screwed spindle, at the lower end of which is a washer, which when forced against its seat by turning the spindle closes the inlet to the tap. When a tap of this kind commences leaking, the old washer should be removed and a new one put in its place. This process is very simple and inexpensive, and can be performed by any intelligent person. The washers consist of leather, except for hot water, when vegetable fibre should be used. A tap, invented by Lord Kelvin, has been introduced within the last few years, in which the washer is constructed of gun-metal, and revolves upon its seat. In its earlier form it was not found to work satisfactorily under high pressure, but it has recently been much improved.

No. 19 Refers to taps for "stand-pipes," and requires that they shall be of the "waste-preventer" kind, and be protected from injury by frost, theft, or mischief. With low pressures automatically closing taps may be employed, but under high pressures they are rarely free from leakage. They are, in nearly all cases, open to the same objections as plug-taps.

No. 20 Requires boilers, urinals, and water-closets to be served only through a cistern or service-box, and forbids the use of stool-cocks, or any direct communication between the company's pipes and such apparatus.

No. 21 Requires the cistern supplying a "water-closet" to be fitted with a "waste-preventer" apparatus, capable of discharging more than two gallons at each flush.

The desirability of altering this regulation being brought before the Local Government Board by several of the Metropolitan Sanitary Authorities, the matter was referred to the London County Council, who again applied to the Sanitary Institute for an opinion upon the subject. After much consideration and experiment, the Sanitary Institute reported as follows:—"That Clause 21 of the Regulations under the Metropolitan Water Act, 1871, should be altered to read: 'So constructed as to discharge not less than three nor more than three and a-half gallons of water at each flush.'" The Local Government Board has, however, pointed out that such a recommendation was not within the purport of the Regulations referred to, which have for their object the prevention of waste, misuse, or contamination of water. The London County Council have agreed to make application to the water companies to amend the Regulations in the direction desired.

An unnecessary use of water is caused when water-closets adapted for use as urinals are fitted with waste-preventing cisterns discharging 2 gals. of water at each flush. For the latter use a much smaller flush would suffice, but there is no means of reducing the flush on such occasions.

No. 22 Is similar to the last, and refers to urinals, but fixes the maximum flush at 2 gals. instead of 1 gal.

No. 23 Requires the "down-pipe" of a closet to have an internal diameter of not less than 1½ in., and if of lead to weigh not less than 9 lbs. to every lineal yard. The object of this, and Regulation 29, from the Company's point of view is not obvious.

No. 24 Forbids any communication between the pipes supplying the Company's water and any part of a water-closet, or any apparatus connected therewith, except the service-cistern.

No. 25 Prohibits the existence of any overflow pipe to a bath, unless it be constructed as a "warning-pipe." The remarks made in connexion with Regulations 14 and 15 apply to this regulation, but to a modified extent.

No. 26 Requires that the inlet shall be distinct from, and unconnected with, the outlet of a bath; that the inlet shall be above the highest water-level of the bath; and that the outlet shall be provided with a perfectly water-tight plug, valve, or cock. These requirements aim at the abolition of baths having a combined inlet, outlet, waste, and overflow (the last being, however, prohibited by Regulation 25), at the bottom. These arrangements are very liable to get out of order, and water might easily escape directly into the drain without ever being noticed.

No. 27 Requires that no alteration shall be made in any fittings in connexion with the supply of water without two days' previous notice in writing to the company. Compare Waterworks Clauses Act, 1863, Sec. 19.

No. 28 Is for the protection of the consumer, where the communication-pipe is laid by the undertakers, and sets forth that no cock, ferrule, joint, union, valve, or other fitting, in the course of any "communication-pipe" shall have a less water-way than that of the "communication-pipe."

No. 29 Requires that all "warning-pipes" and other lead pipes of which the ends are open, so that such pipes cannot remain charged with water, may be of the following minimum weights:

INTERNAL DIAMETER IN INCHES.	WEIGHT PER YARD IN LBS.
½	3
¾	5
1	7

No. 30 Defines "communication-pipe" as being the pipe which extends from the district-pipe or other supply-pipe of the company up to the "stop-valve" prescribed in Regulation 12.

No. 31 Imposes a penalty of 5s. on any person contravening these Regulations.

No. 32 Empowers an authorised officer to act for the company.

No. 33 States that all existing fittings approved by the company shall be deemed to be prescribed fittings under the "Metropolis Water Act, 1871."

#### GENERAL BUILDING NEWS.

ADDITIONS TO USK PRIORY, MON.—The interesting old house known as the Priory, Usk, has just been considerably enlarged by the addition of a new wing comprising a large smoking-room, with garden entrance, servants' hall, and staircase on the ground-floor, and additional bedrooms and bath-room on the first-floor. The new buildings are Domestic Gothic in the Tudor style, stone-built, and the roof is covered with stone shingles, obtained from old roofs; the dressings are in St. Aldhelm Box Ground Stone. The smoking-room ceiling is boarded in oak and divided into panels with heavily-moulded ribs; an oak-panelled dado with moulded skirting and capping is run around the room, and there is a large bay-window, also ceiled and panelled in oak; the whole of the joinery in this room is in oak, as well as the floor, and the fireplace is in character lined with Godwin's (Lugwardine) tiles, having a red Forest Stonemoulded margin and arch, and a large panelled, moulded and carved oak mantelpiece. The curious old corridor has also been restored, the "whitewash" cleaned off the old oak beams, the ceiling and dado lined with oak, an oak screen put between the entrance hall and corridor, and the windows reglazed with lead-lights of appropriate character. The whole of the works, including all the oak woodwork, have been carried out by Messrs. Knox & Wells, contractors, Cardiff, from the designs and under the superintendence of the architects, Messrs. Veall & Sant, of Cardiff, who have supplied the details for all the woodwork and joinery. The lead-lights and casements throughout have been supplied by Mr. S. Evans, West Smethwick; the ornamental door-furniture and ironmongery by Messrs. T. Brawn & Co., Birmingham; the tiles by Messrs. Godwin & Sons, of Lugwardine Works, Hereford; the grates and electric-bells by Messrs. John Williams & Sons, of Cardiff; and the carving, both of stone and oak, has been executed by Mr. W. H. Wormleighton, also of Cardiff.

CATHOLIC CHURCH, DUNFERMLINE.—On the 16th inst., the corner-stone of St. Margaret's Memorial Church, which is being erected by the Catholics of Scotland in Dunfermline, was laid. The church is from plans by Dr. Rowand Anderson, Edinburgh. According to the *Glasgow Herald*, the plan is a cruciform, the greatest length being 194 ft., and the extreme breadth at the transepts 75 ft. The nave has five bays, with two aisles, and the choir has three bays, two of which open into side chapels. The tower at the transept crossing is finished internally with a dome, arched above the arches. The entrance-porch, 24 ft. square internally, is finished with a groined roof. A double door, with archway deeply recessed, gives access from the porch to the nave, and in the recesses provision is made for statuary. It is intended to decorate the apse and the dome of the transept with mosaics, and in the apse and transepts the floor will be paved with mosaic tiles. Immediately below the dome will be the baldachin, which will probably be executed in rich stone or marble. Over the entrance to the nave it is intended to have the choir, and provision is made for an organ over the east chapel in the choir. The exterior view shows a building of the Transitional style of the twelfth century, built upon natural-faced rubble from various quarries. The nave shows a series of five

circular-headed windows in the clearstory, alternating with buttresses of hewn stone, corresponding with the interior bays. The porch shows an open doorway, flanked by strong turreted angle-buttresses. It is 25 ft. high, by 15 in breadth, the sides showing clustered shafts and mouldings. Entered from the porch, on the left, or west side, is the circular bell-tower. It fills the recess between the nave and the porch, has a diameter of 8 ft., tapering slightly to the top, and is 174 ft. high. It is in three stages. The lower stage is used as a baptistry, and externally shows a range of windows alternating with eight buttresses, which terminate in symbolical figures. Above this, for 105 ft., the main body of the tower is plain; and the upper part, which is arched in two stages supported on a band of sculptured figures, is open, and is to be used as a belfry. The tower is finished with a conical stone roof. In the meantime it is not intended to complete the church beyond the nave; but the total cost when the building is finished will probably not be short of 30,000.

PRIMITIVE METHODIST CHAPEL, COVENTRY.—The memorial-stones were laid recently of a new Primitive Methodist Chapel in Ford-street, Coventry. The new chapel will consist of a nave, chancel, and transepts. The internal dimensions will be as follows:—Nave 31 ft. long by 31 ft. 6 in. wide, and 35 ft. 6 in. wide at the transepts. The chancel will be 12 ft. by 9 ft. There will also be an organ-chamber 10 ft. by 8 ft. Provision will be made for the choir in the chancel. The chapel will seat 260 adults, or a mixed congregation of 340 persons. Underneath will be the assembly-room and five class-rooms, affording accommodation for 300 scholars. The architect is Mr. John Wills, of Derby, and the builder is W. J. Worwood, of Coventry.

SCHOOLS, NORTHAMPTON.—The opening of an enlargement of St. James' End Schools, Northampton, took place recently. The works of enlargement have been carried out by the contractor, Mr. William Heap, the architect being Mr. M. H. Holding, of Northampton.

TOWN HALL, DALKEITH, KIRKCUDBRIGHT.—On the 16th inst. Dalkeith Town Hall was opened by Mr. W. J. Maxwell, M.P. for Dumfriesshire. Additional ante-rooms have been added and a lesser hall provided downstairs. The hall will be capable of accommodating about 400 people. Mr. A. B. Crombie, Dumfries, was the architect.

BISHOPSGATE INSTITUTE.—To-day (Saturday), the Earl of Rosebery, K.G., will open the Bishopsgate Institute, Bishopsgate Without, illustrations of which we give this week. A full description of the building will be found on page 374, but we may here mention that the gas-fittings throughout the building have been supplied by Messrs. Sugg & Co., of Westminster.

ALL SAINTS' CHURCH, BUXTON-STREET, E.—This church has just been re-opened by the Bishop of London. The upper part of the tower was condemned last year by the London County Council, and the vicar, the Rev. J. Basil Rust, having collected funds, the decayed part of the tower was taken down, and the work of reconstruction commenced in May. The tower is a parapet of Portland stone, supported by moulded corbels, has been added to the tower, above which is a lofty belfry with coped and gabled roof, and louvred windows of two lights under comprising arches, the eastern gable terminating with an ornamental wrought-iron cross and dormer windows with louvres are built on each side of the tower. The pinnacles of the church have been re-pointed, and the gables of nave and chancel have new copings and crosses of Portland stone. The nave-roof has been boarded and reslated, and a mosaic pavement laid in the porch. The large nave has been panelled to the height of the window-sills, and a low stone screen now divides the nave from the chancel. There are seven steps to the chancel in place of three, and the floor is paved with encaustic tiles, supplied by Messrs. Godwin, of Lugwardine, and high traceried oak screens are erected behind the stalls. The organ has been enclosed by a similar screen, a morning chapel formed at the south-east end of nave, and the walls and roof decorated throughout. The work has been executed from designs by Mr. John Medland, of London, the contractors being Messrs. Harris & Wardrop, of Limehurst. The oak screens were made by Mr. Wilson, of Hampstead-road.

ADDITIONS TO THE STAFFORDSHIRE GENERAL INFIRMARY.—The Staffordshire General Infirmary is being enlarged by the construction of a new south wing and children's ward, from the designs of Mr. Aston Webb. The floors are fireproof throughout on the Fawcett system.

#### STAINED GLASS AND DECORATION.

DECORATION OF ST. JOHN'S CHURCH, EGREMONT, CHESHIRE.—The church of St. John's, Egremont, was recently opened after being decorated in the Byzantine style, the work having been carried out by Messrs. G. H. Morton & Son, of Liverpool, and Mr. Van Bel, their chief artist. In the sanctuary, the basis of the decoration is the idea of resurrection. On the roof our Lord is depicted as seated in Glory upon a rainbow, surrounded by the Archangels Saint Michael, Saint Uriel, Saint Gabriel, and Saint



Raphael. The whole is surrounded by a vesica in the form of clouds. The upper part of the wall from the window to cornice has a ground colour of greeny-buff, and above the reredos are painted three medallions, formed by silver bands or frames with red and blue ornamentation. The centre medallion contains the Lamb of God on the seven-sealed book, resting on a coloured altar, and the other two are treated emblematically of the resurrection—*the phoenix arising from its ashes*, the remaining space being filled with arabesque ornamentation in brown, blue, gold, and silver. On the right of the sanctuary above the window is painted on a gold ground the figure of St. Hilary of Poitiers, the patron saint of Wallasey, and on the left in a corresponding position is St. Nicholas, the patron saint of the sailor, the whole being enclosed by silver styles, forming a kind of arch and dividing band between frieze and walls, and introducing blue, red, and green ornaments. Under the frieze the walls have been treated in "gesso" work, and afterwards covered with gold leaf and decorated in silver, blues, greens, and browns. The capitals and bases of the pilasters are bronzed, the shafts are silvered, and have black outline designs, relieved with red, and the mouldings and wreaths of frieze, together with the cornice, are gilded. The arch of the sanctuary, representing a heavenly choir, is enriched with arabesque ornaments in light reds on a silvery white ground, broken by small medallions holding cherubs' heads. In the nave, the ceiling, which is flat, 100 ft. long by 60 ft. wide, is divided in 45 panels. The panels are worked in a dark cream colour, on which are painted a red and green ornamentation, emblematic of Christ and the Evangelists. The inside colour of the ornamentation is old gold, whilst the styles appear in somewhat lighter tones. The styles have at their intersections the Cross and halo. Then, again, the cornice is decorated in tones of greys, creams, blues, and greens. Above each of the windows in the nave walls a semi-circular space is formed, with a gold diapered ground, containing the half figure of an angel with wings outspread and holding a shield. The space remaining up to the cornice is a deep cream colour, covered with a powdered pattern. Below this and inlaid with the tops of the windows, runs a band of silver-grey, with designs in purple, red, and deep gold colour. The walls below, as far as the dado moulding, is in two divisions, viz., large and small panels, the latter forming a base for the former. Inside the large panels a niche is arranged in silver grey, and the surrounding ornamentation is in red and gold. The spandrels formed have received a conventionally shaded arabesque in blues and pinks. The niches will receive later on the figures of the Apostles, heroic, size two only, St. Peter and St. John, being included in the present contract. The panels for the reception of these figures have a diaper design at the bottom of each niche, and behind the figures hangs a drape in two blues and gold. The bases of the figures are formed of blue and white tiles on which is inscribed in Greek characters the Nicene Creed. The rest of the panels are filled with an arabesque design in light greys and blues, dark blues, violets, and gold. The smaller panels have received an ornamentation of a geometrical character in reds, greens, and blues, and in some panels will be found the emblems of the Apostles. The east wall is divided into panels on each side of the chancel, the centre and large panel being filled with a diaper design on purple ground, with a Greek monogram of our Saviour, the smaller and wide panels having arabesque ornamentation, with medallions containing the emblems of the Evangelists. The angels corresponding to those over the nave windows are bearing shields, on which are placed the Alpha and Omega. The west wall is divided into panels, three on each side of the baptistry. The central panel is filled with a diaper design, the two side ones containing figures of St. Columba, St. Chad, St. David, and St. Augustine. As a base for the whole scheme, the high dado is decorated with geometrical ornamental designs in blended colours, and emblematic of "Faith," "Hope," and "Charity." In the baptistry the designs represent the Trinity. A large panel on each side wall is shortly to receive figure-subjects; that on the right will be "Christ blessing little children"; that on the left will be "St. Philip baptising the Ethiopian Eunuch." In the small panels at the base are fish in water conventionally treated, and this is emblematic of Christian Baptism. The pilaster on the right, supporting the baptistry-arch, is emblematic of St. John the Baptist, and that on the left is also treated to represent the conversion of the Ethiopian Eunuch.

**WINDOW, ST. STEPHEN'S CHURCH, WILLENHALL.**—A window, subject, "Lord, to whom shall we go, Thou hast the words of Eternal Life?" has been placed in the south aisle of St. Stephen's Church, Willenhall, as a memorial to the late Mr. Wakeman, by Mr. T. W. Camm, the Studio, Snettisham.

**WINDOW, HIGHWOOD CHURCH, ESSEX.**—A memorial east window, the work of Messrs. Heaton, Butler, & Bayne, was recently unveiled and dedicated at Highwood Church. The window, which represents the Ascension, is given by Mr. Barlow, of Shacklewell, London, and his sister, Mrs. Francis, now of the Wallands, Lewes, in memory of their father.

#### FOREIGN AND COLONIAL.

**FRANCE.**—The monument to Duban was inaugurated last week at the Ecole des Beaux-Arts. It is in a polychromatic treatment and is situated in the vestibule which precedes the Hemicycle. We hope shortly to give an illustration of it, which will be of more interest and more intelligible than a verbal description. The exhibition of ceramic painting and sculpture by Edmond Lachenal was opened on Sunday last at the Georges Petit Gallery. The paintings, studies, and sketches by the celebrated animal painter Charles Jacques, after being exhibited for a good many days, have now been sold, the first day's sale realising 316,000 fr., the second 43,000 fr. The museum of the Hôtel des Monnaies, at Paris, has been increased by the addition of three new rooms, one of which is to be especially devoted to modern dies. The architects, MM. Faure-Dujardin and Vauchet, have been appointed architectural experts of the Cour d'Appel of Paris. M. Louzier, diocesan architect of Coutances and Sens, has been appointed architect to the diocesan buildings at Toulouse. The administrative departments of the 1900 Exhibition are to be installed in the Galerie Rapp at the Champ de Mars. The Paris Municipality intend to deepen the canal of St. Denis and the basin of La Villette, at a cost of 450,000 fr. There is talk of a new military port on the Channel coast. The position selected by the Government is that of Port-en-Bessin, between Cherbourg and Havre, at the foot of a cliff which divides two narrow entrances, which are to be enlarged and connected by basins sufficient to take the largest ironclads. A straight railway will connect Port-en-Bessin with the principal arsenals of the West of France. The Orleans Railway Company will shortly commence important works for the enlargement of the Stations of Tours and St. Pierre-le-Corps. M. Théophile Barrau, the sculptor, has been commissioned to execute the monument to the poet André Chénier, which is to be erected at Carcassonne. A statue of Meissonnier, by M. Fremiet, which figured in this year's Salon, is to be inaugurated on Sunday at Poissy. The death is announced, at Camiers, of a talented young painter, M. Kotschet, whose works, especially "Une Sortie de l'Eglise à Evoline," were much admired at the Champs de Mars Salon. The former Art-director of the Salons works, M. Gobert, has died at Garenne-de-Berzon, at the age of seventy-three. M. Gobert, who entered on the staff at Sèvres in 1850, on the recommendation of Ingres and Paul Delaroche, was the real and chief promoter of the revival of enamel painting in France.

**GERMANY.**—The popular attraction at the 1896 Industrial Exhibition in Berlin is to be a gigantic telescope larger than all at present existing, which is to be manufactured at Jena. The Berlin Municipality is to be represented at the Exhibition by a pavilion where the various Departments will exhibit.

The lighting of the new Imperial Houses of Parliament will be effected by 62 arc and 5,000 glow-lamps. The foundations of the new cathedral at Berlin are now completed, and a start has been made on the superstructure. Plans for alterations and an enlargement of the Schlossplatz are now being considered by the Municipality. The White Salon of the Imperial Palace is to be adorned by nine statues of the reigning princes of the Hohenzollern family, from the Great Elector to the late Emperor Frederick. The statues will be the work of the most eminent German sculptors. The new Mobilit Bridge, which joins the Brückenthal to the Kirchstrasse, is now complete. The structure has three arches, and is carried out in dark grey basalt, from plans by Dr. Hobrecht. The principal ornamentation is afforded by four large stone bears, fashioned by Messrs. Begas, Goetz, Boese, and Pieper respectively. Professor Theodor Mommsen has been appointed Vice-Chancellor of the Order "Pour le Mérite," Science and Art Division, in succession to the late Professor von Helmholtz. No fewer than 150 artists took part in the competition for the Bismarck monument, to be set up opposite the new Imperial Houses of Parliament. Thirty premiums, of a total value of 5,000 fr., were offered. The sum of 17,000 fr. voted by the Diet of the Duchy of Baden for the restoration of Heidelberg Castle is proving inadequate, as several works which were not provided for in the original estimates must be carried out for the safety of the edifice. The so-called "Karlsschanze" has had to be completely demolished and rebuilt, and in other places the ingrowing of roots of trees rendered similar procedure necessary. The works should be completed next year. There is to be a Trade and Industrial Exhibition at Lübeck next year. A guarantee fund of over 15,000 fr. has already been subscribed. No. 11 of the "Limes" Journal contains Lieut. Dahm's report about the investigations on the ancient frontier between Hohn and Langenschwalbach in Nassau. The works are uniformly south-west, parallel to the Rhine, except in one place where the line of the wall deviates to encompass the castellum of Hilscheid, which is situated on rising ground. The walls of this fort were 12 metres thick, and attached to it was a fortified camp, from the absence of traces of buildings, was probably used as a temporary halting-place; the defence of this part of the country was evidently meant to be concentrated on the Rhine, more than on the boundary-

wall. Remains of another castellum were unearthed at Hohn, and also of seven watch-towers. Herr Jacobi reports on the investigations between Grauer Berg and Altsburg, on which line traces of nine towers and five castles were discovered, as well as remains of a fairly large settlement at Altsburg. The Bavarian Commissioner, Herr Conrad, has traced the frontier for three kilometres near Miltenberg, here marked by pointed stones, partly buried in the ground. The West Castellum at Neckarbecken is described by Dr. Schumacher. A complete set of Roman baths was brought to light in connexion with the latter investigations.

**SELANGOR, STRAITS SETTLEMENTS.**—On Oct. 1, the Governor of the Straits Settlements, Sir Charles B. H. Mitchell, laid the foundation-stone of the new Government offices in Kuala Lumpur, the principal town of the state. The building will meet a long-felt want, as the present offices are much too small, and the staff is continually increasing. The building on plan occupies three sides of a parallelogram, having a frontage of 480 ft. and a depth of 170 ft. The front forms one side of the principal square in the town, the other sides containing the largest and most important building in the place, and the whole when finished will form a fine group of buildings. The building will provide homes for all branches of the staff, with the exception of the police and the Courts of Justice, and will include the State Council Chamber, general post office, and municipal offices. The style of architecture adopted is that usually found in Indian public offices—a style rather difficult to name. At each end are projecting wings, one containing the Mines Department, and the other the Public Works Department. Between this and the side are circular staircases projecting in front of the main wall and carried up above the roof with domed tops. In the centre is the main entrance, containing the principal staircase, and in front of this is a large portico. Above the staircase a clock-tower rises to a height of 140 ft. The whole of the offices should be light and cool, as each room has a 12 ft. veranda on each side of its site, this latter being a necessity in such a hot climate. The building will be built of bricks made at the P. W. D. Factory, the external walls faced with picked bricks, the dressings being of stucco, as there is no stone in the Malay Peninsula. The roofs are covered with Mangalore tiles made at the factory, and the whole of the work is being carried out departmentally under the superintendence of the architect. The building was designed by the Government Architect. The same day the Governor opened an extension of railway up to the Pahang boundary, and also visited the Victoria Institution. This building was recently opened. It was built from funds raised in Jubilee year to erect a memorial of Her Majesty's long reign. It is used as a boys' school of a better class than that usually found in the native state, being of the same class as the Raffles School in Singapore. It consists of a large school-room and class-rooms raised well above the ground so as to form a covered playground under the floor. The building is of red brick and half-timber work, with segmental tiles on the roof. This was also designed by the Government Architect, as was also the schoolmaster's bungalow attached to the school.

**THE NEW HARBOUR WORKS AT COPENHAGEN.**—The new free harbour and depôts at Copenhagen are situated to the north of the town, on the Sound, where formerly extended the fashionable promenade, the Langelinie. There are three great basins or docks, the whole establishment covering an area of many miles. There are half a dozen huge buildings of red bricks on the quays, in which are located the customs house, the administration, railway, and telegraph offices, merchant offices, and the electrical station for lighting the entire establishment. That of the administration is the most ornamental, being surmounted by a fine clock tower. The concern is managed by a company. There are, of course, also immense warehouses, some of which are constructed of corrugated iron. The main basin has an area at the bottom of 780 ft., and a depth of 30 ft., so that the largest steamers may discharge right into the warehouses. The main basin is divided into three parts by parallel walls of concrete, 3,000 ft., 2,000 ft., and 1,000 ft. in length. Here are also situated the largest warehouse of all for the storage of grain, which has seven stories. The works have been five years under construction, and the cost has been nearly a million sterling.

#### MISCELLANEOUS.

**THE TRANS-SIBERIAN RAILWAY.**—The commission for the construction of the Trans-Siberian railway has, according to St. Petersburg journals, decided to accelerate the work so that the line may be opened for traffic in its entirety in 1901, instead of as originally contemplated three years later.

**VILLA NEAR CHRISTIANIA.**—Referring to the competition design for a villa near Christiania, which we published on page 204 *ante*, and to our remark that we gave it as an example of the present taste in villa architecture in Norway, we hear that the *Teknisk Ugeblad*, which is said to be the organ of the Norwegian Association of Architects and Engineers, denies that the design is representative of the present taste of the day.

**ABERDEEN: THE HOUSING OF THE WORKING**



**CLASSES ACT, 1890.**—The statutory notices have been published of application by the Town Council or a Provisional Order to be confirmed in next session of Parliament, in connection with the scheme or dealing with the unhealthy area adjoining Exchequer-row. Compulsory powers are asked for acquiring 1.3 acre of land with the buildings thereon at an estimated cost of 25,776*l.*, the value of the land being 14,865*l.* The area to be acquired is bounded on three sides by existing but narrow streets—viz., Exchequer-row, Ship-row (part of), and Chapel-lane (part of); and still further to improve the access, the house No. 1, Virginia-street, will also be required and taken down. Power is sought to clear away the houses where advisable, to form, divert, or improve streets, and to appropriate parts of the areas acquired, or other lands belonging to the Corporation, for the erection of suitable dwellings for persons of the working-classes displaced by the scheme—all such dwellings, when erected, to be satisfactory in every respect. The labouring-class population to be displaced numbers 1250, and it is estimated that for these it is required that efficient and suitable accommodation can be had in 240 vacant dwelling-houses in the neighbourhood, the rents of which vary from 3*l.* to 10*l.* per annum. It is thus probable that the centre of the area will meantime be converted into an open space, pending the settlement of the question of the construction of a new street from the docks to the Green of St. Mary, and it is likely that one of the new buildings will be a model common-lodging house. The Order is not expected to be opposed. The new street spoken of would, if carried out fully as suggested, run a long way through the city and form a new north road, two miles in length; but the large initial expenditure—1250*l.*—is more than the Town Council can face—at present at least.

**CHURCH BUILDING.**—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its first monthly meeting for the present session on the 15th inst., at the Society's House, No. 7, Dean's-yard, Westminster Abbey S.W., the Archbishop of Exeter, in the chair. Grants of money were made in aid of the following objects, viz.:—Building new churches at Aldington St. Philip, near Brighton, 150*l.*; Cockington St. Matthew, near Torquay, 150*l.*; Crewe St. John, 100*l.*; Forest-gate St. Mark, Essex, 75*l.*; and Matthew's Park St. Matthew, in the parish of West Ham, Essex, 75*l.*; rebuilding the Mission House, Elfrida, Llanfair-yn-Elwyl, near Buth, Radnor, 25*l.*; and towards enlarging, or otherwise improving, the accommodation in the churches at Ebony St. Mary, Kent, 10*l.*; Gawcott Holy Trinity, near Buckingham, 15*l.*; Treffgarra, near Haverfordwest, 15*l.*; and Upperby St. John Baptist, near Carlisle, 25*l.*. Grants were also made towards the building of new churches at Llanegwad, near Nantgardeg, Carmarthen, 25*l.*; and Washington, Durham, 20*l.*. The following grants were also paid for works completed.—Wanstead Slip St. Columba, Essex, 250*l.*; Brechfa St. Teilo, near Nantgardeg, 20*l.*; Linthorpe St. Barnabas, near Middlesbrough, 20*l.*, balance of a grant of 100*l.*; Holy Trinity, near Longton, 10*l.*; St. Clare, near Carlisle, 20*l.*; St. Martin, near Lavenham, 20*l.*; St. Keverne, Cornwall, 60*l.*; Alderton St. Margaret, near Cheltenham, 25*l.*; Barnes St. Michael and All Angels, 10*l.*, making 187*l.*, on account of a grant of 225*l.*; Northborough St. Andrew, near Market Deeping, 15*l.*; Pucknowle St. Mary, near Abbotsbury, Dorset, 20*l.*; Ealling St. Aidan, near Lymington, 20*l.*; Lawrence, near Gloucester, 30*l.*; Woolwich St. Mary, Kent, 20*l.*; Witherne St. Margaret, 10*l.*; North Bersted, near Bognor, 40*l.*; Long Hanborough, near Oxford, 40*l.*; King's Hill, near Wednesbury, Staffs., 40*l.*; Holmer-green, near Amersham, Bucks, 40*l.*; and Sunderland Point, near Lancaster, 15*l.*. The Society likewise accepted the trust of 50*l.* of money as repair funds for Ockley-green St. John, Surrey, 100*l.*; Walkden Moor St. Paul, Lancs., 10*l.*; and Speen St. Mary, Berks, 50*l.*.

**NEW BOARD SCHOOLS, LONDON, 1894-5.**—For their annual provision of increased school accommodation, by way of new sites or the enlargement of their existing schools, the London School Board have scheduled a total of seventy-six parcels of land, situated as follows:—William-street, Langford-road, Kingwood-road, Bryans-lane, and Munster-road, or Sherbrooke-road, Fulham; Newcombe-street, Kensington; Bolingbroke-road, Hammersmith; Lots-road, and Keppel-street, Chelsea; Blackstock-road, Rotherfield-street, Marlborough-road, Payne-street, and Gooding-road, Islington; Clarence-place, Central-street, St. Luke's, Winchester-street, Clerkenwell, Church Man-or-way, and Swing Gate-lane, Plumstead; Siebert-road, Randall-place, and Creed-place, Greenwich; Forston-street, and Grange-street, Shore-ditch; Olga-street, and Wood-street (with Church-row), Bethnal Green; Windsor-road, and Eleanor-road, Hackney; Adia-road, the Anerley Board School, and Mile-end-ranger; Mantle-road, Canterbury-road, and Shardloe-road, Deptford; Rushy Green, and Millam-road, Lewisham; Salvador West, Tooting; Priory-road, Lambeth; Forfar-road, and Lavender Sweep, Battersea; Rosendale-road, Streatham, and "Arborefield," No. 27, Streatham Hill, New Park-road,

Clapham; Beresford-street, Fauce-street, and Chatham-row, St. Mary, Newington; Cormont-road, Southampton-street, or Peckham-road, Chroumet-grove, Nunhead-passages, Marlborough-road, and 1.20-street, or Asylum road, or Studholme-road, Camberwell; Rhyl-street, Netley-street, and Longford-street, Marylebone; Nos. 26 and 28, Haverstock Hill; Salisbury-place, Finnerow-road, and Limasol-street, Bermondsey; St. George's-road, and Gerriage-street, Southwark; Collingwood-street, Ratcliffe; Cable-street, St. George's-in-the-East; Bright-street and Bromley Cottages, Dee-street and Caloden-street, Bromley; Portman-place and Morph-street, St. Matthew's, Bethnal Green; Emmott-street, Jubilee-street, Greenfield-street, Mile End; Albion-street, Mile End, or Malmesbury-road, Stratford-the-Bow; Northey-street, Limehouse; and a portion, about 50,800 square ft., of the Millbank Prison site. These amount to a net total of seventy-one sites, covering an aggregate of 413 acres; the piece in Rosendale-road, West Lambeth Division, being about 33 acres. It will be observed how the Board Schools, following the population, are gradually springing up in the remoter districts, and that a large share of the new schools are to be built in the east and south of London. The highest divisional totals, 113 acres for twelve schools, occur both in Greenwich.

**THE CITY CREMATORIUM.**—At the meeting of the City Commissioners of Sewers held on Tuesday last the main question on the agenda was a motion to rescind the resolution passed by a small majority a month ago in favour of erecting a crematorium at the City cemetery at Ilford. After a brief discussion of the report of the Streets Committee the meeting was made special for the discussion of the rescinding resolution, which was moved by Mr. Turner, seconded by Mr. Deputy White, and supported by Mr. Bradman and Mr. G. H. White. The resolution of October 23 recommended the promotion of a public Bill in Parliament to give the Commissioners the necessary powers for the erection of the crematorium, but the meeting was now informed by the legal officer of the Corporation that the matter could not be the subject of a public Bill since it concerned one municipality only, and that the country generally. An attempt was made to get the matter recognised as one of national importance, on the ground that cremation must sooner or later be adopted by the nation for sanitary reasons, and that the City of London, as a leader of opinion, might properly promote a public Bill giving legal powers to all municipal authorities for the purpose. A resolution by Mr. Deputy White of the list of the year's liabilities of the City ensured the rejection of the project once more. On a show of hands the majority was declared to be in favour of the rescinding resolution, and on a division this conclusion was confirmed by 24 against 15.

**CORRESPONDENCE CARDS.**—Messrs. Sprague & Co. send us a set of correspondence cards with sketches from Windsor and its neighbourhood; the set comprising a dozen different sketches, occupying each a portion of a card, giving views of Windsor Castle, Eton College, Windsor Cloisters, the choir-stalls in St. George's Chapel, one or two bits of street architecture in Windsor, &c. They look pretty, and will do very well to send Christmas greetings on.

**NEW PULPIT, CATHOLIC CHURCH, SPANISH-PLACE.**—A new pulpit, the gift of Lady Sykes, has just been added to the Catholic Church, Spanish-place. It is designed by Mr. E. Goldie, and executed in alabaster, with detached Purbeck marble shafts below the floor-line. The figures of SS. Paul and John seated on either side divide the body of the pulpit into three equal parts. The interior is lined with cedar, and the same material forms a covering to the top of the cornice. With the exception of the handrail and gates, which are by Messrs. Hart, Son, Peard, & Co., the work has been carried out by Messrs. Earp & Hobbs, sculptors, of Lambeth and Manchester.

**WOOD-TURNING MACHINE.**—On Wednesday, Mr. H. J. Burke, of the firm of Messrs. Burke, Bros., of Scranton, Pa., U.S.A., gave a private view at 40, Kirby-street, Hatton Garden, E.C., of a machine for turning wood, either round or square. The machine, which is worked by steam-power, consists of a changeable set of revolving cutters, and a movable frame to carry the wood, travelling backwards and forwards over them, and is operated by three levers. The machine can turn newel-posts, balusters, porch-columns, chair and table-legs, columns and pilasters for cabinet work, &c., either round, square, octagon, hexagon, and pentagon, or one half round and one half square, or almost any design. The machine can turn out concave and convex work, and it can deal with both hard and soft woods, and at great speed. We were informed that eighty square-turned baluster-rails can be turned out finished from the machine in one hour, at a cost for labour and power of about 1*s.* 6*d.*, and that it can turn out ten different patterns in thirty minutes, making the necessary changes as well. A complete set of machines for turning consists of two machines, which can turn from 1 in. up to 8 inches square, and from 1 in. to 10 ft. long. The machine was not in working order at the time we saw it, but samples of the work which it had previously done were shown, and judging from their character the machine is

likely to have an important effect on the wood-turning trade.

**LAND SALE.**—Mr. H. J. E. Brake will offer for sale on the 29th inst., at the Mart, Tokenhouse-yard, E.C., ninety-three plots of freehold land, being part of the Pelitars' allotment estate, in the Parish of Hestley, Hants; 110 plots of freehold land on the South Wonston estate, near Winchester, and a freehold estate at West Hanningfield, Essex.

**PORTLAND CEMENT AND ADVENTURES.**—At a meeting of the cement trade held at the London Chamber of Commerce on Tuesday last, it was resolved:—“That a committee be appointed, with power to engage experts, to investigate into the question of the admixture of Kentish Rag Stone, or other stone or other material with Portland cement so far as carried on at home and on the Continent, and to report and advise thereon. Representatives of the following firms have been appointed upon the committee: Messrs. Barron & Co.; the Burnham Cement Co.; Francis & Co. Limited; Gibb & Co.; Hilton, Anderson, Brooks, & Co.; J. C. Johnson & Co.; Lee, Son, & Co.; the London Portland Cement Co.; the Tunnel Cement Co.; J. B. White & Bros.; and the Wouldham Cement Co.

## LEGAL.

### A SURVEYOR'S FEES.

THEODORUS D. GREGAR.

THIS case was heard on Monday, before Mr. Roxburgh, Assistant-Judge, and a Common Jury, in the Lord Mayor's Court. The plaintiff, Mr. Henry Theobald, a quantity surveyor, of 87, Finsbury-pavement, sued the defendants, Messrs. W. Gregar & Son, builders, of Stratford, to recover the balance of an account for professional fees. Mr. Duke (instructed by Mr. Phillips) was counsel for the plaintiff, and Mr. Raven (instructed by Mr. Godlee) for the defendants. In the early part of last year the defendants were engaged in erecting a factory and offices for Messrs. Johnson & Butcher at Stratford. The plaintiff was employed to take out the quantities for a number of "extras" at a commission of 2½ per cent. on the total amount of additions, and the like for omissions plus the usual out-of-pocket expenses. His total account amounted to 44*l.* 12*s.* 6*d.*; he had been paid 32*l.* 4*s.*, and now he sued for the balance. The jury found for the plaintiff for the amount claimed.

### A BUILDER'S RESPONSIBILITY.

AN action of some importance to the building trade was heard at the Bow County Court, on the 24th inst., in which William Munday, a builder's scaffolder, of Bermondsey, sued Messrs. Perry & Sons, builders, of the Tredegar Works, Bow, to recover £80, under the Employers' Liability Act, for injuries sustained through the negligence of defendant's foreman, and also through defective plant.

Mr. Sturgess was for the plaintiff and Mr. Ruegg for the defendants.

Plaintiff's case was that on the evening of April 30 he was employed in erecting a scaffold outside an arch on the approach to the Tower Bridge. Matthews, defendant's foreman, told him to get the poles up at once. He, in doing so, had to pass under an arch lighted by one lamp. It was a windy evening, the lamp was blown out, and, in the darkness, he caught his foot at the end of a tramway line, the ends of which projected upwards, was thrown down, pitched upon his right knee, the bone of which was fractured. He was taken to Guy's Hospital, where he remained three weeks, and was not able to work again till the last week in September. His average wages were 30*s.* per week.

Dr. Lees described the injuries, and believed there would always remain a chronic inflammation in the knee-bone.

Mr. Ruegg contended that defendants could not be held responsible, as the works were lighted, not by the contractors, but by the Corporation of London. Besides, the plaintiff knew the arch and the locality, and he had been told that if he had not sufficient light, to go to the foreman's office, and he could always have an extra lantern or candles, but he never complained. Messrs. Perry allowed the plaintiff 1*l.* per week for eleven weeks after the accident, besides assisting his wife in other ways.

His Honour held that as defendant's foreman gave the order, it was a neglect on his part not to see that the men had sufficient light to enable them to do the work with safety, and he must find for the plaintiff. Judgment for 50*l.*, with costs.

Mr. Ruegg intimated that he should give notice of appeal.

## CAPITAL AND LABOUR.

**STATE OF EMPLOYMENT IN OCTOBER.**—According to this month's *Labour Gazette*, a slight improvement has taken place in the condition of the labour market as a whole during the month of October, and the effect on employment in several industries of the termination of the Scottish coal dispute is clearly perceptible. Fifty-seven trade unions, with an aggregate membership of 358,507, have made returns, showing the total number of unemployed members at the end of October to be







at the head of John Pier, for the Grand Jury of the County of  
 Suffolk, to John Harn, C.E., County Surveyor, so, George-  
 street, Lincolnc.  
 James O'Donoghue — £2,500 — 1 inch & Co. Chepstow.  
 Manisty — 2,200 — Wales — estimated. — £2,500  
 [Engineer's estimate, £2,120.]

LLANDRINDOD WELLS — For building two houses at  
 Llandrindod Wells, Radnorshire, S.W. Wales, town Meirion,  
 Roberts & Son, architects, Bank Place, Portmadoc:—  
 Robert E. Davies, Rock Terrace, Llandrindod Wells, £2,700  
 [Wine: it is an latter wine-house.]

LONDON — Accepted for alterations, new bay windows, &c., at  
 the "Wentack Arms," Wentuck-road, City-road, for Messrs.  
 Courage & Co. Ltd., Mr. A. J. England, architect, 189, tenn-  
 ison-street —







# The Builder.

VOL. LXVII. NO. 2754

DECEMBER 1, 1876

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Plan of Tewkesbury Abbey Church.—Drawn by Mr. R. W. Paul.....	Double-Page Photo-Litho.
Reredos, St. Nicholas, Blundellsands.—Mr. W. D. Caröe, F.R.I.B.A., Architect.....	Single-Page Ink-Photo.
Oak Pulpit, St. Paul's Church, Great Portland-street.—Mr. Paul Waterhouse, A.R.I.B.A., Architect.....	Single-Page Ink-Photo.
Window, Oldbury Church, Salop.—By Mr. Alfred O. Hemming.....	Single-Page Ink-Photo.
Design for Stained Glass.—By Mr. P. H. Newman.....	Single-Page Ink-Photo.

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### The Water-Supply of Towns.



MULTI communities have almost invariably grown up in the vicinity of water, instinctively realising the necessity of this gift of nature. As, however, they have increased in proportions, the supplies of water, which were sufficient for them in their earlier days, have frequently become overtaxed, and larger supplies have had to be obtained. As the growth of communities is rarely rapid, it has generally been possible to further develop the original sources or to supplement them from the immediate locality. But there are other influences at work which impede this co-extension of a local water-supply with an increasing population, for the causes of pollution which are ever attendant upon modern civilisation, are increasing too, and sources (except such as are deep-seated) which are situated in or passing through populated areas have one by one to be abandoned. An era comes at length in the history of almost every community when the local sources of supply become inadequate, and the serious question has to be asked, "Where are we to get our water?" This difficult problem, which has become more important year by year, has been most worthily met by the engineering profession throughout the world, and "waterworks engineering" has arisen as a special branch of the profession. It is with great pleasure that we chronicle an addition to the literature of this important branch of engineering, and we congratulate the author upon the practical, straightforward common-sense shown in the preparation of this work.

The early contributions to this class of writing were mostly from the pens of eminent scientists, and partook more of the academy than of the field. They treated only a narrow though important branch of the investigation, and the results they arrived at were mostly founded upon ingenious theoretical calculations and practice limited to the laboratory. The works which have followed

are mostly infected with the strain of their predecessors, and are replete with abstruse mathematical refinements. There is a pre-Raphaelitism in science as in art, the real essence of great engineering truths being frequently clouded, and even totally obscured, by a mass of intricate details which are insignificant in their practical bearing. Approximation within certain limits has ever been the aim of great engineers, to whom we owe most of our simplest formulæ and rules.

The author introduces his subject with a few well-selected reasons for the construction of waterworks on a large scale, and dives slightly into the history of early systems.

With regard to the important question as to whether waterworks for public supply should be in the hands of private companies or should be municipal undertakings, the author is very decided. He says "that a matter of such vast importance to the public health is not one which should be left in private hands; and, indeed, that it is not a matter from which profit should be made at all—that is to say, a direct money profit for individuals, or even a municipality. The profit, of a most solid kind, to the community is undoubted." He points out, however, that supplies of water have been provided in certain places through the instrumentality of private companies which would not otherwise have been available. A reservation is made as to supplies for "manufacturing purposes or for purposes purely of luxury—such as gardens and fountains," these being considered as a fair field for profit. The author is also of opinion that insurance against loss by fire is another legitimate field for profit as regards water-supply. It is not very clear, however, how this can be placed upon a practical basis except by voluntary concessions upon the part of the insurance companies. The important bearing which an efficient water-supply has upon the value of property in America is shown by the following extracts from Mr. Fanning's "Water-Supply Engineering."

"At Columbus, Ohio, the average loss by fire for the four years preceding the completion of the public waterworks was  $\frac{1}{100}$  of 1 per cent. of the valuation. The average loss during the first four years after the completion of the works was  $\frac{1}{100}$ , and during the fifth year, from April 1, 1875, to April 1, 1876, was  $\frac{1}{100}$  of 1 per cent. the valuation. These statistics show a probable saving in the first four

years of upwards of one-half million dollars, and in five years of more than the entire cost of the water-works."

Mr. Fanning further states that:—

"In a recently-adopted schedule of the National Board of Underwriters there are additions to a minimum standard rate in a standard city, which is provided with good water-supply, fire-alarm, &c., as follows, termed 'deficiency charges':—

Minimum standard rate of insurance of a standard building.....	25 cents.
If no water supply.....	15 "
If only cisterns, or equivalent.....	10 "
If system is other than gravity.....	05 "
If no fire department.....	25 "
If no public organisation.....	05 "
If no building law in force.....	05 "

The financial value of the enhanced fire risk, as deduced by the Board from an immense mass of statistics, and the additional premium charged on the most favourable buildings, is 60 per cent., without good waterworks, and 40 per cent. if only fire-cisterns are provided."

The value of chemical analysis in the selection of a source of water-supply is fully discussed, and the engineer is warned against being led blindfold by it. The author says:—"Should the report of the chemist be condemnatory, the water may be condemned out of hand, at any rate after a second analysis has confirmed the first; but, if the result of the analysis is to indicate a pure water, more care is necessary on the part of the engineer. He must make a personal examination of the source; if it is a river or a stream he should follow it to its beginning, noting along both banks what possible sources of pollution there may be. Whatever the result of a chemical examination may have been, the water of a river should be condemned if it is found that there is a copious discharge of sewage into it a mile or so above the proposed intake." The practice of forming an opinion upon a source of water-supply from a single analysis is severely condemned. This naturally leads to a consideration of the self-purification of natural streams. The dictum of the Rivers Pollution Commission, "that there is no river in the United Kingdom long enough to effect the destruction of sewage by oxidation," has, as a result of recent investigations, to bear considerable modification; and when it is remembered that the rivers of this country are almost microscopic as regards their length in comparison with many foreign rivers, it is

\* "The Water-Supply of Towns." By W. K. Burton, A.M. Inst.C.E. London: Crosby Lockwood & Son.

probable that the latter may become polluted and self-purified several times during their course.

The common impurities met with in water are classified as:—

1. Dissolved inorganic matter.
2. Suspended inorganic matter.
3. Dissolved organic matter.
4. Suspended organic matter.
5. Micro-organisms.

These sub-divisions are separately described, and their influence upon the quality of the water indicated. The various sources of water-supply are classified, and ably described.

The next subject dealt with is the quantity of water to be provided. The author commences by strongly advocating the use of the cubic foot, instead of the gallon, as the unit of measurement for waterworks purposes. We entirely agree with him in this, both for the sake of accuracy and of simplicity. The confusion often caused by the difference in capacity between the imperial gallon of Great Britain and the United States gallon (five of the latter being equal to four of the former), is adduced as an important reason.

The supply of water per head per day, necessary for all purposes, exclusive of trade and manufacturing purposes, is estimated by Mr. Burton as follows:—

2 (or even  $2\frac{1}{2}$ ) cubic ft. (=  $12\frac{1}{2}$  to  $15\frac{1}{2}$  gals.) of water per head per day, is an unusually small mean supply.

3 (or at the most  $3\frac{1}{2}$ ) cubic ft. ( $18\frac{1}{2}$  to  $21\frac{1}{2}$  gals.) mean supply per head per day ought to be sufficient in nearly all cases.

4 cubic ft. (= 25 gals.) per head per day is stated as a very ample mean supply.

These figures presume that a fair amount of care is taken to prevent waste.

The author points out that in England and on the Continent very stringent regulations for the prevention of waste have in some cases reduced the mean consumption, even in water-closet towns, to the lowest figures given above. This may be very possible at many places on the Continent, no doubt, where ideas as to the use of baths and as to cleanliness generally are very much behind those which are fortunately now general in England; but it is perfectly certain that any town reduced to such a supply as 15 gallons per head per day is most inadequately supplied with water, and that any such standard for English cities at the present time is ridiculous; and in our opinion the author's maximum supply of 25 gallons is not by any means so ample a one as he seems to consider it.

The conditions of supply are considered under the following heads:—

1. Where the minimum supply equals, or is greater than, the quantity demanded.
2. Where the minimum supply is less than the quantity demanded, but the average supply is equal to, or greater than, the quantity demanded.
3. Where the average supply is less than the quantity demanded.

The first division indicates sources that are sufficient and require no storage; the second those that are insufficient without storage; and the third those that are insufficient. The usual methods for calculating the yield of a source by gauging over weirs and by observing the velocity of flow in channels with floats or instruments are referred to.

The next chapter deals with the storage capacity to be provided for impounding reservoirs, and the varying elements upon which the calculation must be based. A reservoir plays much the same part in connection with a waterworks that a fly-wheel does in regard to a steam-engine, allowing the supply to accumulate at such times as it may (within certain limits) exceed the demand, to be expended when the situation is reversed. In this calculation the author points out that the requisite storage must depend upon the proportion that the available quantity of water bears to the total gain (all over the catchment area (the differ-

ence between these quantities being due to evaporation, absorption, and transference to other catchment areas in the form of springs). As this coefficient varies with the extent and physical nature of the surface of the catchment area, formulae which do not take these variations into account cannot be of general application. The author, however, states that Mr. Thomas Hawkesley's well-known formula  $c = \frac{100}{\sqrt{r}}$  has "undoubtedly been found to apply with approximate accuracy to England."

In discussing the question of filtration, the author makes a strong point of regulating the speed of filtration through sand, and mentions an automatic system to effect this, designed by himself for the Tokio Waterworks. He considers that a perfect system of filter-bed discharge should be adjustable to any determined speed and remain constant at that speed; that the filter-bed should be capable of being filled from below; that the waste of water in cleaning out the beds should be reduced to a minimum; and that the apparatus should indicate when a certain maximum head for overcoming the friction of the filter-bed has been reached.

Very meagre information is afforded as to the use of polarite for water filtration. On p. 80 the author quotes a statement that polarite is pure magnetic oxide of iron. The following is an analysis by Sir Henry Roscoe:—

Magnetic oxide of iron .....	53.85 per cent.
Silica .....	25.50 " "
Lime .....	2.91 " "
Alumina .....	5.68 " "
Magnesia .....	7.55 " "
Carbonaceous matter and moisture .....	5.44 " "

With regard to the quotation as to the rate of filtration through polarite, 100 to 1,000 gallons per square yard in twenty-four hours (p. 117) we believe that at the Reading Corporation Waterworks 15,000 gallons of water per square yard of filter are purified in twenty-four hours.

A "service reservoir," as distinct from a storage reservoir, compensates for the diurnal variations in the demand for water, as well as providing a further supply of water for fire-extinguishing purposes. Any excess of capacity over that required for these purposes will, therefore, cause stagnation, thus deteriorating the quality of the water. The author says, quoting from Mr. Henry Gill, M.Inst.C.E., "Investigation has proved that if a service-reservoir has a capacity corresponding to seven hours' mean supply it is capable of compensating for the inequality of the consumption during the twenty-four hours, even at times of maximum daily consumption." This makes no allowance for fires, which, if they occurred when the reservoir was nearly empty, would necessitate the opening of the by-pass. The author considers this too low a standard, and suggests, tentatively, that a capacity of at least nine or ten hours' mean supply should be adopted, apart from an ample provision for fire. We would venture to say that even the author's standard is too modest.

The subjects of pumping-machinery and distributing systems are well treated, though one cannot but remark on the very slight reference as to the laws which govern the flow of water in pipes and channels; a subject generally so much more fully treated in works of this class. On the other hand, some very interesting details are given, in the chapter upon pipes, as to wrought-iron and steel rivetted pipes. As these pipes are made from rolled plates, uniformity in the thickness of the metal can be secured with much less weight. Taking this into consideration, as well as the greater tensile strength of steel, the author says:—

"The pipes (steel) may be made even less than one-half to one-quarter the weight of cast-iron pipes of the same diameter, to work at the same pressure. . . . Allowing a very ample factor of safety, allowing for some inequalities in the thickness of the plates from which the pipes are made, and also allowing amply for the reduction of strength by the

rivet-holes, the weight of mild steel pipes will be found to vary from about one-third to one-seventh that of cast-iron pipes. The advantage in the matter of freight is, however, even in a higher ratio than this, as the pipes lend themselves more readily to 'nesting' than do cast-iron pipes. This is particularly true when, as is often done, the pipes are shipped unriveted. . . . Breakage . . . may be said not to occur at all in the case of wrought-iron or mild steel pipes."

The importance of these advantages, where pipes have to be conveyed long distances either by sea or over-land, will be readily apparent.

The use of wooden pipes is stigmatised by the author as a "backward step"; but this is only true in a qualified sense. Where water has to be carried long distances, the pressure at no point being great; where the carriage of heavy materials is difficult and expensive; and where suitable wood is plentiful and at hand, the practice is economical and satisfactory. It has been found so after fair trial in the United States, and an interesting description of the method of construction employed is to be found in a communication from Mr. J. D. Schuyler, the American engineer, printed in the "Proceedings of the Institution of Civil Engineers," Vol. CXVII.

Appended to this work is a short essay by Professor John Milne, F.R.S., upon "The Effects of Earthquakes on Waterworks." His advice may be summarised as follows:—In erecting buildings or laying lines of pipes, avoid soft or steep ground and river-banks. Leave an open area around the basement of a building. Avoid arch-work. Make the bases of all structures rising above the ground of increased strength. Use only good materials, particularly good cement.

A second appendix consists of a collection of notes, some of which are from the pen of Dr. E. Divers, F.R.S. Dr. Divers' criticisms are, to say the least, amusing, if somewhat dictatorial. The book is profusely illustrated both by means of plates and diagrams. These have evidently been prepared with great care, and cannot fail to be of great assistance to the student.

#### HAMPSTEAD CENTRAL PUBLIC FREE LIBRARY.

OUR sets of designs submitted in a limited competition for the above have been on view this week at the Hampstead Vestry Hall, the competing architects being Messrs. Basil Champneys, Horace Field, T. G. Jackson, A.R.A., and Arnold S. Taylor.

The decision of the Library Commissioners had at the time of our visit not yet been made, but there can be little doubt as to the relative merit of the designs. That by Mr. Horace Field is clearly superior to all the others, and is most nearly approached by that of Mr. Basil Champneys, the remaining two designs being by a long way inferior to those already mentioned.

The site is at the corner of Arkwright-road and Finchley-road, and has a steep fall along the Arkwright-road frontage towards the Finchley-road. All of the competitors have placed the entrance to the library on the Arkwright-road frontage, and the lecture-hall proposed as part of the scheme at the opposite end of the site to the Finchley-road; thus advantage is taken of the fall of the ground to get a well-lighted basement under the level of the library floor.

Mr. Horace Field's plan is simple, straightforward, and admits of easy supervision and economical working, whilst the rooms are well lighted and the details well worked out. Entering from Arkwright-road, with the necessary steps placed externally, access is obtained by a shallow porch to an ample entrance-hall. Immediately in front is the lending library; on the right, the reference library; and on the left, facing Finchley-road, the news-room and magazine-room.

The librarian's room is in a quiet position at the rear of the reference library, which it overlooks. The lecture-hall, is well propor-



oned, readily accessible from the library building, and has adequate means of exit. The book-stores and repairing department are in the basement, and a contemplated future extension is suggested over the magazine and news room. The exterior is treated in a dignified and picturesque version of Georgian work, according well with the local spirit of old Hampstead. No undue extravagance raises the cost beyond the limits of the financial conditions of free public libraries.

The plan submitted by Mr. Basil Champneys is, as regards the library portion of the scheme, very similar in general lines to Mr. Field's design, though the details are not so fully or so adequately worked out. The lecture-hall is not so well managed, the cloak-room accommodation is inadequate, and the entrance unskillfully arranged. The lecture-hall does not communicate with the library except by a suggested door into the reference-library. The exterior is picturesque and simple in treatment, quiet and refined, and the design is possibly one of the least costly of those submitted.

Mr. Arnold S. Tayler has not carefully studied the requirements of modern free libraries, and, lacking experience, has evolved his plan from his inner consciousness. The plan is therefore marked by a rabbit-warren character, lacks efficiency of supervision, and would be costly in administration. The proportions of the lecture-hall are very unsatisfactory, and we hear the unfortunate lecturer would be practically inaudible to the majority of his listeners. The exterior is treated in the emasculated version of Tudor which some time ago was in vogue for educational establishments, and lacks interest. The drawings are carefully prepared, but the lack of experience has rendered abortive the considerable pains which the author has taken.

We regret very much to see the set of drawings to which the name of "Thos. G. Jackson" is appended. It would have been far more dignified for an architect in Mr. Jackson's position to have declined the invitation to compete rather than to have lent in a set of drawings which are so discredit to his reputation, and are a reflection upon the fame of the Royal Academy, of which he is a member, and upon the Art of architecture of which he poses as an exponent. Mr. Jackson should remember that his position demands that he should uphold the dignity of architecture as an Art in the eyes of the world, both on its artistic and constructive side. The plan which Mr. Jackson submits shows either an absolute ignorance or a cynical disregard of all the requirements of a Free Public Library. A central elliptical hall has eight doors radiating to the various rooms, which are labelled with the names of their supposed uses, but there is no attempt at providing for the necessary supervision or the convenient working of the several departments, and it will be scarcely believed that the windows lighting the magazine and newspaper rooms on their longest sides look on to an area 11 ft. wide, on the opposite side of which is the lecture-hall, 24 ft. high to the eaves, and 46 ft. high to the ridge. The exterior is treated in a picturesque but extravagantly expensive manner, whilst the design is characterised by an unsatisfactory lack of good proportion, and the insertion of coarse and eccentric detail. In fact, taking it all round, the design is quite unworthy of its author.

#### NOTES.

It is unfortunate that the question of the ventilation of hospitals, which is such a very serious and difficult one, should appear too often to be considered from a polemical rather than a purely scientific point of view. Comparing the general tenour of Mr. Young's

paper, at the Architectural Association with the speeches which followed it, one cannot but think that the real object was to make a demonstration against any "new-fangled" systems of artificial ventilation, and that the medical men and Mr. Young's friend Mr. Graham were specially invited to uphold this view. We are not committed to one view or the other—natural or mechanical, as we think more experience is required before the question can be considered settled; but we should like to have heard a little more of both sides. The only circumstances under which we consider that mechanical ventilation is an absolute *sine qua non* are those which exist in buildings, such as public rooms, meeting-rooms of all kinds, which at special and limited times are often crowded in an exceptional manner. Any one who doubts the need for mechanical ventilation in such cases we should set down as either ignorant or perverse. It may be that, as Mr. Young's paper would imply, a hospital should be regarded merely as a large house full of sick people, and treated as such; but there are certain considerations on the other side of which no hint was given in the paper. A hospital in a crowded city, for instance, is in a perfectly different case from a hospital on a country site; the air is full of impurities, and it is a most important question whether it should not be a paramount object to employ a system of ventilation under which the point of admission of air can be selected, and the air cleaned before its diffusion in the building. There are disadvantages in connexion with such a system, but it has yet to be seen whether its advantages do not outweigh them, at all events for winter. No one believes more in open windows than we do, and we have always declined to countenance any system of artificial ventilation which presupposes the permanent closing of windows; but the extent to which open-window ventilation can be trusted to in winter for sick people was much exaggerated in the discussion; nor must too much weight be attached to medical opinion on such a point. As a general rule medical men know very little about ventilation; they have each their own "fads" about it, and oppose the "fads" of all the others. Mr. Graham's light-hearted statement in the discussion, that "it mattered very little where inlets were placed," is not calculated to raise public confidence: there must be a better and worse way, and the public will expect architects to know which is which; nor is it any more satisfactory to be told that by open windows and fireplaces "we get a ventilating power at work both winter and summer." The circumstances are entirely different in winter and summer, and what answers at the one season does not necessarily answer in the other. Mr. Henman's system, which is to be employed at the Birmingham Hospital, has still to be tested, but it certainly deserves every attention, and under the circumstances Mr. Henman's remarks in the discussion may be said to have been very guarded and moderate. We do not think the discussion at the Association has advanced the subject much.

AMONGST the private Bills to be introduced next Session is one for a widening of the Strand on its south side between the west side of Ivy Bridge-lane and the east side of Carting- (formerly called Dirty-) lane, a widening of Carting-lane along its east side as far as Herbert's passage, and alterations of the levels between the Strand and the Embankment gardens. The Bill proposes to stop up what is yet left of Salisbury- and Cecil-streets; and to confer powers for the new undertaking upon the Liberator Permanent Benefit Building Society, and J. W. Hobbs & Co., Limited, and Mr. Samuel Wheeler or other the liquidator of those companies, or a company to be incorporated in that behalf. Ivy Bridge-lane, between Salisbury- and Adam-streets, marks the position of Ivy Bridge, *olim* Ulle-brig, in the Strand (cited

by Stow as "now taken down"), and separates the City of Westminster from the Duchy of Lancaster liberty. On the site of the houses it is proposed to remove stood Salisbury House, built next west of the Bishop of Carlisle's "inn" (since Bedford, and then Worcester, House) by Sir Robert Cecil, afterwards Earl of Salisbury. Queen Elizabeth went to the house-warming on Dec. 6, 1602. William, the second earl, divided the house into two, taking Great Salisbury House for himself, and letting Little Salisbury House to his son-in-law, the Earl of Devonshire. Great Salisbury House and the Middle Exchange were pulled down, in 1695, for Cecil-street, at whose east side is Carting-lane. The site of Little Salisbury House was leased in 1692, for the building of Salisbury-street, which Payne rebuilt; and to which the brothers Adam added the concave circus and steps at the river end. The west portion of the circus stood over Ivy Bridge-lane, which was overlooked by the back bay-windows of one side of Salisbury-street. At the foot of the lane was the "Fox-under-the-Hill" tavern, by which—as our older readers may remember—was gained Salisbury-stairs\*—whence the halfpenny boats plied to London Bridge. After the explosion of the boilers of the *Crickel*, which killed six persons and injured many more, the steamboat traffic was discontinued, and the lane was closed by an iron gate at its Strand end. But for many years afterwards it could be ascended from the water-side, presenting a singular appearance, being covered for the greater part by portions of houses along each side which darkened the way and converted it into a tunnel square on section. Pennant records that the Earls of Rutland had a house near Ivy Bridge; at the site of one of the houses marked for demolition lived for nearly a century the Vaillants, foreign booksellers. Of the buildings that have been recently erected at the south ends of Cecil- and Salisbury-streets, between Carting- and Ivy Bridge-lanes, we gave accounts, with plans, section, and illustrations, on April 28 and October 20, 1888, and February 21, 1891.

THE report on an outbreak of diphtheria at Hythe, in the New Forest Rural Sanitary District, sent in by Dr. Bulstrode to the Local Government Board, states that the water supply of Hythe is derived for the most part from shallow wells situated in the curtilages of the cottages, and apparently sunk through the clay into an underlying water-bearing stratum. There is one public well fitted with a pump, but Dr. Bulstrode was unable to ascertain either its depth or the nature of its steining. The shallow wells are only dry-steined and not properly protected from the influx of surface impurities, and some are in dangerous proximity to privies. As to drainage, what is called the "sewer" is the result, it appears, of the gradual covering-in at different times of a streamlet which runs through part of the village, and empties itself into Southampton Water near the pier. The stream is said to be quite dried up during the warmer months of summer. Into this "sewer" several tributary sewers or drains enter, some of them apparently old brick culverts or drain-pipes, and others (the more recent additions) 6 in. and 9 in. glazed cement socketted pipes. Along what is known as South-street, there runs a 6-in. agricultural drain which discharges on to the foreshore. Houses that are "unconnected" with the "sewers" are drained direct to the foreshore, or into cesspools, from some of which overflow-pipes are said to pass into the "sewers." There are but few indoor sinks; usually the yard-gully is made to serve as a sink. Excrement is disposed of in the majority of instances by means of pit-privies, sunk below the ground-level, which are emptied

\* See "Ivy Bridge" and "Salisbury Stairs" in S. & N. Buck's large riverside view: 1749.



by the occupiers when full. In some cases these privies are so near to houses as to render the pollution of the soil underlying the dwelling a by no means unlikely event. The principal predisposing causes of disease usually found in such cases—shortness of water, defective drainage, or none, and privies near dwellings, seldom emptied—are all found together at Hythe. Dr. Bulstrode was informed by one of the Guardians that a satisfactory water supply could be obtained for Hythe at a moderate outlay. Surely it is, then, the duty of the authorities to set about obtaining it without delay.

IN Dr. Horne's Report to the Local Government Board on the Prevalence of Scarletina in the Hucksall Torkard Urban Sanitary District, we find that in this case the water supply is satisfactory. The water is obtained from the new red-sandstone formation in the parish of Calverton, and is pumped into a storage reservoir, and piped thence to taps in the houses or to stand-pipes. The supply, which is constant, is in the hands of the Sanitary Authority. There is also a system of sewers constructed of glazed earthenware pipes, though not in the best condition. When we come to excrement and refuse disposal, we find the usual conditions in rural districts. The asphalt-privy obtains almost exclusively throughout the district. The ashpits are capacious, with their floors usually sunk below the ground level; and they are not watertight; several were observed in bad repair, with their brickwork crumbling away; many also required emptying. It is to be noted, however, that in this case the Sanitary Authority contracts for the scavenging of the privies, the work being conducted between 10 p.m. and 9 a.m. in summer, and between 10 p.m. and 10 a.m. in winter. Nuisance, however, arises from throwing the privy contents in process of removal on to the ground near dwellings, which is intensified from the circumstance that, in many instances, the ground is either not at all or only partially paved. Probably, however, if the clearance were left to the inhabitants to carry out, the state of things would be much worse.

THE Trades Technical Schools carried on by the Carpenters' Company and other City Guilds have recently transferred their headquarters to the building at 155, Great Titchfield-street, for some time occupied by the Polytechnic, and at the invitation of the Carpenters' Company a large number of gentlemen interested in technical education attended to assist Sir Henry Roscoe in an inspection of the schools on Thursday last week. The building is well-adapted for a school of this sort, though its neighbourhood is somewhat obscure. The range of work is extensive, embracing woodcarving, carpentry and joinery, bricklaying and brick-cutting, painters' work, wheelwrights' work, and masonry and plasterers' work. Classes dealing with all these branches were at work, under competent instructors, at the time of the inspection, and we were impressed with the intelligent interest displayed by the students, most of whom seem to be of the artisan class. These students seem to be imbued with a desire to improve their workmanship and extend their range of experience, and the schools offer many excellent facilities for so doing. The lines of employment are too often exceedingly narrowing in their effect, and this disadvantage can be effectually counteracted by artisans attending these schools, where, in addition to the instruction given, considerable influence is brought to bear on the student by the models and photographs and other demonstrations of the most excellent past and present examples of the work of the different trades. We were much interested to notice the presence of the drawing-board and T-square in most of the workshops. Endeavours are evidently made to induce

the student to master the intricacies of the setting and drawing out of the object which he is about to develop in the different materials. This institution is, without doubt, doing good work, and deserves all the success which has rendered necessary its recent move to larger premises.

IT is somewhat remarkable to find a monograph written for his doctor's degree by a German Professor beginning with a quotation from Sir Joshua Reynolds. Such is the case, however, with the discourse on "Greek Portrait Art" (Griechische Porträtkunst), just published by Dr. Franz Winter—a dissertation which should interest not only archaeologists but all students of the history of art, and especially those who are interested in its more modern developments. Thirteen years ago we were all accustomed to think that "realism" in Greek portraiture was its latest development. Since the Acropolis excavations have yielded us a mass of portrait statues we have realised that the days of Peisistratos were a time of vivid realism and almost excessive individuality, out of which the "idealism," the typical manner of Pheidias and the canonical tendencies of Polykleitos, slowly developed. Then came a reaction towards realism, though with some attempt at the indication of character in a subjective manner. But here at first the new movement tended to the observation of accidentals—passing intense expressions, it needed an Apelles or Lysippos to understand and express the permanent man. It may be new to some to learn that ancient portrait art suffered badly from the nearest ancient approach to photography. The brother of Lysippos discovered the art of taking casts in plaster from the human face, the perfect accident outside verisimilitude, pleasing, no doubt, to the untrained eye of friend and relative, but without any of the more subtle quality of expression, born of the true artist's comprehension.

A STAINED glass window has been on view this week at Messrs. Britten & Gilson's works, which is of considerable interest both for its originality of design and as an experiment with a new form of glass, the make of which is, we are informed, the suggestion of Mr. E. S. Prior, the architect. The glass is made by being blown into a mould with a roughened interior surface, and comes out as a glass smooth but wavy in surface on the blown side, and roughened on the mould side. The result is a thick pot-metal glass which gives a great richness and iridescence to the colour, and, in fact, approaches more to the consistency of some of the richest Mediaeval glass than anything else we have seen. It is costly, but the effect is worth the cost. The window in question, designed by Miss Lowndes, is a three-light one with figures of St. Michael, St. Raphael, and St. Gabriel, and is an admirable specimen of genuine stained-glass design, entirely in pot-metal with the exception of a little surface-painting in the faces and the folds of the drapery. The leading of the light glass around the margin of the figures is treated specially, so as to carry out the effect of radiation intended to be conveyed in the design. The whole is emphatically a stained-glass design in the true sense, without the slightest taint of pictorial treatment.

THE "Christmas Numbers" of illustrated papers rarely contain anything which is worth speaking of from the artistic point of view; but we may congratulate the *Queen* on having issued in its chromolithograph entitled "A Portrait Study," a coloured print which is in a better and purer style than the general run of such things. The other "chromo," "A Reverie," is also a very pretty composition. Why is not the artist's name given on the plate? It is a pity to find, in the body of the paper,

the usual ugly and inartistic fashion-plates of women with waists of impossible and hideous tenuity. Why it should be supposed to be necessary, in illustrating a costume, to draw a figure such as cannot possibly exist in nature, is a mystery. One would have thought it was the very worst way to recommend a costume; it is certainly the worst possible example to set up in a lady's paper, whether in regard to art or healthfulness.

#### LETTER FROM PARIS.

SINCE our last letter, the question of the Metropolitan Railway has not made much progress, which seems to indicate that the Municipal Council, in spite of an apparent complaisance, is persisting in the blind hostility which for twenty years it has shown towards all the projects submitted to it. According to the latest information, the Council wished to demand from the Government, as an absolute condition, the engagement to construct a supplementary line from the east to the west, on the line of the Rue Reaumur. Government, on its side, has been exceedingly conciliatory, and inclined to make all kinds of concessions. It promises that if the Council accepts the immediate execution of the main lines, A and B, the line by Rue Reaumur shall be carried out in 1901. From 1901 to 1905 the connexion between the Gare de Lyon and the Gare St. Lazare, by way of the Place de la République, would be carried out; the remainder of the system would subsequently be carried out, and the City of Paris is to have the right to purchase the whole metropolitan railway system, as thus completed. That is how matters now stand. The city authorities continue to receive very coldly the Ministerial advances; the time passes, the public waits, and the all-powerful "Compagnie Générale des Omnibus" has the satisfaction of seeing the inaction of the ministration prolonging, for its profit, the monopoly of an absurd transport system.

Paris has two new monuments: that to Duban, inaugurated a week since at the Ecole des Beaux-Arts; and that erected at Père-la-Chaise in honour of the celebrated metal-founder, Barbedienne. M. Guillaume, the Director of the Académie de France at Rome, described in an eloquent speech the long and honourable career of Duban, gaining the Prix de Rome when still young; then, on his return from Italy, commissioned to carry out the Ecole des Beaux-Arts; subsequently carrying out the restoration of the Sainte Chapelle, and of the Château de Blois, with a profound knowledge both of Renaissance and Mediaeval architecture, "bringing the spirit of ancient art into his work under the Empire, as if the spirit of his illustrious predecessors, from the time of Pierre de Montreuil, had passed into him." But these great works did not absorb him entirely, and Duban still found time to lend to the Municipality his experience and knowledge at the sittings of the architectural committees, as well as at the Municipal Council, which at that time included among its members another great artist, Eugène Delacroix. The events of the "année terrible" mortally affected the venerable architect, who died in 1870, overcome by the spectacle of the disasters of his country.

The Barbedienne monument does great honour to its sculptor, M. Alfred Boucher. It is certainly one of the best in Père-la-Chaise. On a high stele in Vosges stone is placed the bust of the eminent founder who has brought to perfection the casting of works of art. This pedestal, with a funeral urn in front of it, is accompanied by two female figures bearing palms; one, who symbolises Art, wears a helmet surmounted by a chimera; the other, representing Industry, is armed with a hammer. At the foot of the sarcophagus forming the base of the monument is seated the figure of a young girl, letting fall a torch the flame of which is just extinguished.

The mention of these two monuments reminds us of the new monument to Balzac about which Paris has been much occupied the last few days. It may be remembered that it was the "Société des Gens de Lettres" which took the initiative in regard to this monument, which was to have been executed by Chapu. After the death of that artist, many other names were discussed, and finally, thanks to M. Zola, M. Auguste Rodin was chosen in preference to M. Marquet de Vasselot, author of an absurd statue of Lamartine which has been erected at Passy. The selection of M. Rodin was unanimously approved. It was even said that there was a sort of affinity between his temperament and that of the cele-



brated author of the "Comédie Humaine." Unfortunately M. Rodin, who was to have finished his work in eighteen months, is extremely conscientious and difficult to please, never content with his sketches, recommending his studies again and again. He was, therefore, not ready at the time, and when once the allotted period was passed the "Société des Gens de Lettres," less patient than the State or the Municipality, complained bitterly about having advanced the artist a sum scarcely sufficient to pay for his first studies, and even threatened him with legal proceedings. M. Rodin, much hurt at this treatment, at once offered to return the money, only asking that he should have the necessary time to realise his conception of Balzac, which he had been studying incessantly for two years. The Société appeared disposed to accept this arrangement, but the partisans of M. de Vasselot are in hopes that M. Rodin will abandon the commission in disgust, and that in that case M. Zola will resign his post as President of the Committee. The matter is still under discussion, but public opinion is severe on the Société des Gens de Lettres, and astonishment is expressed that a society of novelists and poets—people who are generally susceptible in regard to their own works—should behave in this way to an artist so well known and so esteemed as M. Rodin.\*

It is announced that M. Guadet, Vice-President of the Société Centrale, has been appointed by the Government Professor of the Theory of Architecture at the École Nationale des Beaux-Arts, in place of the late M. Edmond Guillaume. This is an excellent choice, since M. Guadet has been for eighteen years the respected head of one of the ateliers of the school. He is therefore fully prepared for the task of expounding publicly the theories which he has so long taught to his pupils, many of whom have become well-known artists. At the École des Beaux-Arts will shortly take place the exhibition of the casts from the monuments discovered by M. Homolle and the members of the French School at Athens, on the site formerly occupied by the ancient city of Delphi. Among these casts is a splendid figure of Antinous, perfect in all except the arms, an archaic Apollo in a good state of preservation, and other interesting fragments of Greek art.

The competition in perspective has just been decided at the École des Beaux-Arts. Medals have been awarded to M. Quillet, pupil of M. Laloux; M. Neukomm and M. Charlet, pupils of M. Guadet; M. Tallant, pupil of M. Deglane; M. Guaiard, pupil of M. Redon, and M. Prost, pupil of M. Marcel Lambert.

The sale of the pictures and drawings of the painter Charles Jacques has been the great artistic event of the month. The general results of this sale, which had been preceded by an exhibition in the Georges Petit Gallery, were given in the *Builder* last week. The manager of the gallery had got up for the occasion a splendid catalogue with a number of illustrations, and prefaced by a biography written by M. Jules Claretie. This exhibition, which comprised more than six-hundred objects, including some furniture executed by the artist himself, was exceedingly interesting, in spite of a certain monotony arising from the repetition of the same subjects. The purity of drawing and harmony of design, in the artist's ideal compositions, poetic in spite of their extreme simplicity, was not more remarkable than the extraordinary knowledge of animals displayed in his farm-yard scenes.

The Louvre is undergoing some important rearrangements. The pictures of the German school, which were formerly in the Great Gallery, have been placed in a special gallery, hitherto occupied by the works of Joseph Vernet, which, in their turn, have been removed to the Musée de Marine. Thus the collection of German pictures, not a large one it is true, but with a certain value, will form a respectable group by the side of the fine collection of German drawings which have been recently hung. These various changes have been very well carried out under the direction of the new architect to the Louvre, M. Blondel, who is also giving his full attention to the dangers which may arise to our national collection from the dampness of the walls in the older portions of the Louvre—dangers of which the results are especially visible in various pictures of the Spanish and Italian schools. Among the recent gifts made to the Louvre may be noted four painted panels by Boucher, which formerly decorated the rooms of the Ministry of

Finance, and which represent the "Repos des Bergères," "Le Vendange," "La Toilette," and "Diane au Bain."

We may mention also that the Cluny Museum has acquired, at the price of 21,000 frs., an ivory plaque in the form of a diptych, which dates from the fifth century, and was the principal object in the celebrated collection of Henri Baudot. In the centre of this plaque is the figure of a consul, believed to represent Stilicon, the nephew of the Emperor Theodore, while at his feet, in a kind of primitive perspective, is represented an amphitheatre of spectators looking on at combats between men and animals; representing perhaps the games that the consuls gave at the time of their investiture.

The Société Nationale des Beaux-Arts has decided to have a medal struck with the portraits of its two Presidents, M. Alexandre Charpentier, the sculptor, has been commissioned to model the heads of Meissonier and M. Puvis de Chavannes for the proposed medal.

## THE ARCHITECTURAL ASSOCIATION:

### *The Sanitation of Hospitals and Infirmarys.*

The ordinary fortnightly meeting for the present session of the Architectural Association was held on the 23rd ult., in the meeting-room of the Royal Institute of British Architects, Mr. E. W. Mountford (President) in the chair.

The following thirty-six new members were elected, viz., Messrs. L. D. Philpott, F. J. O. Smith, H. A. Chapman, C. Bree, G. B. Carvill, P. W. Cleave, J. S. Dunn, J. R. Ireson, C. Martin, A. Smithers, E. W. Allfrey, G. Bailey, N. C. Bathurst, T. Bee, A. R. Carey, E. F. Cobb, C. F. Dawson, R. E. Eddison, H. C. R. Hide, E. T. Marriott, C. H. Fowler, H. Mennie, R. J. A. Shield, R. S. Balfour, P. R. Bradford, H. R. Creighton, V. Esch, F. V. Forrest, G. T. Forrest, S. J. Halse, E. C. Haskins, E. W. Hobkirk, A. G. Pile, E. W. Pugh, F. C. Thomson, and S. Towse.

Mr. Keith D. Young then read the following paper entitled "The Sanitation of Hospitals and Infirmarys:—

The question will no doubt have occurred to many of you, what is there in the sanitary conditions of a hospital which so differentiates it from an ordinary dwelling-house as to render it necessary or desirable to treat it as a subject in itself? The essentials of sanitation, a clean and dry site, substantial and dry walls, a roof that is weather-tight, and drainage and plumbing arrangements of sound construction and properly devised, surely these are as necessary to the smallest cottage as to the largest hospital. This is all perfectly true; but there are conditions affecting the health of the inmates of a hospital which are to be found in no other kind of building, and which lie at the root of all questions of hospital sanitation. And it is upon these special conditions peculiar to hospitals that I propose to speak to you this evening.

In the first place, then, it is essential that we should have a clear understanding of what a hospital is: simple as this may appear, it is, nevertheless, the very root of the whole matter, and the want of a true knowledge of it has been and still is the cause of much disaster.

For our purpose to-night it will suffice if we divide hospitals into two classes: 1st, those which exist for the benefit of the patients, and 2nd, those which exist for the protection of the community. In the first class are comprised all those hospitals known broadly as general hospitals, including also the majority of special hospitals; and, in the second, hospitals for the treatment of infectious fevers.

In the first class then, we have a group of buildings which are devoted to the treatment of sick and injured poor—eleemosynary establishments, the first and most important function of which is charity. In these hospitals a large number of patients are gathered together, very often literally under one roof. Without such a grouping of large numbers of patients in one building or one group of buildings, it would be impossible to extend the benefits of medical and surgical relief to anything like the numbers of patients needing help, and as it is, the struggle for existence is, as you possibly know, hard enough. But the point to which I wish to draw your attention is this:—That it is not to the advantage of the patients that they should be congregated together in large buildings or in large wards; but, on the contrary, this very fact is an element of grave danger to the patients themselves. To put the matter plainly, the ideal hospital is one in which each patient should be treated in a ward by himself,

entirely cut off from all possibility of aerial connexion with any other ward. This is of course an economic impossibility, and it is the function of hospital sanitation to combat the dangers involved by the necessity of grouping large numbers of sick together.

I cannot do better than quote to you words written just thirty years ago, by Sir John Simon, in a report on Hospital Hygiene, to the Privy Council.

"The rules of hospital hygiene are (he says) in principle simple enough. That which makes the healthiest house makes likewise the healthiest hospital—the same fastidious and universal cleanliness, the same never-ceasing vigilance against the thousand forms in which dirt may disguise itself, in air and soil and water, in walls and floors and ceilings, in dress and bedding and furniture, in pots and pans and pails, in sinks and drains and dustbins. It is but the same principle of management, but with immeasurably greater vigilance and skill; for the establishment which has to be kept in such exquisite perfection of cleanliness is an establishment which never rests from fouling itself; nor are there any products of its foulness—not even the least odorous of such products—which ought not to be regarded as poisons."

The air of a hospital ward is liable to contamination from the following causes:—

1. The evacuations or effluvia from the bodies and excreta of patients.

2. The presence of suppurating wounds with their necessary dressings, poultices, &c.

3. Foul linen, bedclothes, &c.

And these necessary and unavoidable conditions common to all hospitals may be aggravated and their danger intensified by:—

a. Insufficient air space.

b. Insufficient ventilation.

c. Inadequate or improper arrangements for the removal of refuse of all sorts.

d. Faulty arrangement of buildings.

To illustrate the truth of these propositions, I will take two examples of hospitals which may serve as object-lessons in hospital hygiene.

My first example is the famous old Hôtel Dieu at Paris; often as this remarkable, I might almost say unique, building has been described, I think the lessons to be learnt from its history are so valuable, that I need not apologise for bringing it to your notice this evening.

I have here a plan of one floor of part of the Hôtel Dieu as it existed at the latter end of the eighteenth century. Howard, who visited this hospital in the year 1783, says of it and its auxiliary, the Hospital of St. Louis, that "they are the two worst hospitals I have ever visited. They were so crowded that formerly I have often seen five or six in one bed, and some of them dying." Tenon, whose memoir on the hospitals of Paris was published in 1758, says, "In the middle are placed the most infectious departments, such as clothes stores, mortuaries, dissecting-rooms; they (i.e., the patients) are contained in four or five floors of wards joined together and without ventilation, wards surrounded by rooms for the staff which cool and shade them; where the staircases are insufficient; where the sole and only promenade is a place encumbered with drying-grounds and linen in course of evaporation; a monstrous pile more fit to prolong sickness, to destroy, than to re-establish and preserve health."

Look for a moment at the plan, with the vast ward running the whole length of the building, and containing 168 beds, of which 118 were for four patients each, giving a grand total of 552 patients, and then note that on the south side there are no windows at all, whilst on the north the windows must nearly all have had their sills above the ceilings of the adjacent rooms. This sort of thing was repeated on three upper floors with slight variations, and in addition to this building there were other wards on the opposite bank of the Seine, and on one of the bridges connecting the two sides.

The latrines were in close proximity to the wards, were insufficient in number, and are described by M. Tenon as masses of ordure, and the extent to which infection must penetrate the wards as inexpressible. Within the walls of this vast pest-house were gathered not only ordinary sick, but patients suffering from infectious and contagious diseases of all sorts, lying-in women and lunatics. And the immediate result of this state of things was that one patient out of every four died. You have here, then, every defect by which the structure of a hospital can contribute to the destruction rather than the preservation of life, and you see the result.

My second example is the old Lincoln County Hospital. I have chosen this in order that I may

\* Since this was written it appears, on the authority of a correspondent of the *Pall Mall Gazette*, that M. Zola has resigned, along with some others of the committee.



contrast with it the building which replaced it, and which is still one of the best examples, twenty years old though it be, of a good county hospital.

In 1863, when this hospital was inspected by Mr. Timothy Holmes, he found that in consequence of a severe outbreak of erysipelas and other septic diseases certain alterations had been made in the structure and its drainage, which, it was hoped, would remedy the evils referred to. The hospital itself he describes as a building of irregular structure, a great part of it being nearly a century old. Like most hospitals of that period it was "composed of small wards not so much ill-provided with window space as having their windows inconveniently placed for hospital purposes, the windows being wide and low, and at one or at two contiguous ends of the wards, so that it became necessary to crowd the beds together away from the windows." He notes also that in the older part of the hospital the floors were of plaster, than which a worse material for the purpose can scarcely be imagined. The hopes for the better future of the hospital expressed in Mr. Holmes' report were doomed to disappointment, for in succeeding years the recurrence of pyæmia was so persistent that it became obvious that nothing short of demolition would suffice to root out the evil. Here again, there can be no doubt that the structure itself was to blame. The number of small ill-ventilated wards, all in intimate air connexion with one another, was at the root of the difficulty. Septic disease does not readily spread about a hospital if the wards are properly separated one from the other and efficiently ventilated.

Contrast this with the plan of the present hospital, the work of my friend, Mr. Alexander Graham. Note the long and narrow wards, each bed with its proper complement of light and air, the offices properly disconnected from the wards, the latter from the administrative offices, and the laundry and mortuary duly isolated from every other part.

Let us now take in order the various points which I have mentioned as tending to aggravate and intensify the necessary processes of fouling which must go on in all hospitals.

Insufficiency of air-space and insufficient ventilation are closely allied, and must be considered together. Air-space, indeed, is of little value by itself unless it is accompanied by ample means of ventilation. And by air-space I mean not only cubic space but floor-space; a most important point to note. It is useless to supply your patients with a generous amount of cubic space unless you first see that they have sufficient floor area. Of the importance of free ventilation the experience of great wars is of the utmost value. A very striking case occurred during the Franco-German War—I believe in Paris—where it happened that a church and a slaughter-house were about the same time converted into wards for the reception of wounded soldiers. In the church gangrene broke out, and the mortality among the men was very heavy. In the slaughter-house, although the cubic-space was many times less per man than in the church, the cases did well and septic disease was not seen.

The essential point of difference in the two buildings was this. The church was a solid building with windows high up in the walls, and very little means of ventilation; whilst the slaughter-house was a mere shed, with louvre-boarded sides, freely swept with air from end to end. This point is further illustrated by the experience of hut hospitals, as compared with wards improvised in permanent buildings, as far back as the Crimean War and in the Civil War in America; which led many experienced surgeons to the conclusion that hospitals should always be temporary structures which should be destroyed at frequent intervals.

The question of ventilation cannot be considered apart from that of warming. The two are inter-dependent and cannot be separated.

Ventilation, then, means the supply of fresh air, warmed to the requisite temperature, and in sufficient volume to preserve a given standard of purity without producing draughts. The rule generally adopted in practice is that each patient should have a supply of 3,000 cubic feet of air per hour. This amount is requisite in order that the total impurity of the air may not exceed 16 per 1,000. To accomplish this without draught, the air of the ward should be changed not oftener than three times per hour, which gives a minimum allowance of cubic space of 1,000 ft. per head. It is very difficult to lay down any fixed rules for determining the necessary allowance of cubic space. The nature of the disease treated, and the situation of the hospital, must be taken into consideration.

In a country hospital, where the cases are for the most part of a mild or chronic nature and the site is open, 1,000 ft. may often suffice. Where the average of acute cases is greater and a hospital is in the centre of a big town, more cubic space is required; and in hospitals in manufacturing towns, where severe surgical cases are frequent, I think 2,000 ft. is not excessive. The tendency to draft-off patients to convalescent hospitals as soon as they are fit to be removed, and so to keep the wards full of acute cases, is an element that must be taken into consideration now-a-days.

Ventilation is commonly divided into two classes—natural ventilation and mechanical or artificial ventilation. In natural ventilation the agency of winds and other openings, aided by the upcast power of the smoke-flues from open grates, is relied upon. In artificial ventilation the air is either pumped in by mechanical appliances and allowed to escape through openings or shafts constructed for the purpose, or it is sucked out either by fans or by the aspirating power of heated shafts. In either case the air must be warmed before it enters the ward.

It would be impossible for me to describe the many systems which have been devised for the ventilation of wards by mechanical means in the time we have at our disposal this evening. The object, however, of each is practically the same; namely, to ensure a regular and automatic change of air in the ward by mechanical means, altogether independent of winds.

The question which concerns us is this: Is there any evidence to prove that wards cannot be kept sufficiently sweet and healthy without recourse to expensive automatic appliances? So far as the experience of hospitals in this country goes, I think that not only is there no such evidence, but that there is some very definite evidence in support of the exact converse. There is a case cited by Dr. Bristowe and Mr. Holmes in the report to which I have before alluded, which goes to prove that mechanical ventilation can become a positive evil. I allude to the York County Hospital, which, when it was erected, was furnished with an apparatus for warming and ventilating by a mechanical process by which the air was warmed in the basement and driven into the wards by the aid of a steam-engine, the vitiated air being carried off by shafts warmed by hot pipes. The wards were not provided with fireplaces, and the windows were mere apertures for light, and were not made to open. This system remained in work for nine years. During that time it was said that the wards were always close, sickly, and even offensive; and erysipelas increased to such an extent, and proved so often fatal, that the surgeons gave up operating altogether, preferring to abandon their patients to disease rather than risk operations with almost certainly fatal results. The system was abandoned, fireplaces constructed and windows made to open. When this was done erysipelas disappeared, and the health of the hospital became what it ought to be.

No doubt in this case the apparatus itself was deficient. I give the case for what it is worth; but it is not without its value if only to show how mischievous such a system can be if improperly devised.

To return to our question: Is artificial ventilation necessary? To prove that it is necessary we must assume that the ordinary means of ventilating by open windows is inadequate. Now, I venture to affirm that there is no evidence whatever in support of such an assumption. A distinguished Paris surgeon, Dr. Le Fort, in 1862 published a Report on Hospital Hygiene. He there compares the mortality in London hospitals with that of the Paris hospitals, very much to the disadvantage of the latter; and professes himself decidedly in favour of the natural means of ventilation adopted in London to the artificial systems in vogue in some Paris hospitals. But he says one need not go to England to search for means of comparison between the two systems; for the two hospitals in Paris where the mortality is greatest are precisely those in which artificial ventilation is employed. And this, remember, was at a time when antiseptic treatment was unknown, and the paramount importance of cleanliness was not recognised as it is to-day.

The matter appears to me to be very fairly stated by Sir Douglas Galton in his book on "Hospital Construction." "The system of propulsion for hospital ventilation (he writes) has not found general favour with hospital architects or managers in this country. There is one very patent and valid reason, which is that in this climate windows can be kept open; and when windows are open the volume of fresh air which passes through a ward will be at least twenty

times greater than either the theoretical 3,000 cubic feet per hour, or even the 5,000 or 6,000 cubic feet, which some of these systems profess to furnish, without entailing the large expenditure of fuel necessary for moving a large volume of air."

So, also, Dr. Bristowe and Mr. Holmes, in the report to which I have already alluded. "No amount of cubic feet of space, no plan of building, no artificial system, no combination of these adjuncts to a good ventilation has ever been found to replace open doors, windows, and fireplaces, while provided with the latter, which are the essentials of good ventilation, many old crowded defective hospitals have maintained for a long series of years an amount of success which the most eminent examples of scientific construction have never found practicable."

Everyone who has any experience of hospitals in this country knows that there are very few days in the year during which ward windows cannot be kept open—and I cannot think it justifiable for the sake of those few days to establish a complicated system, involving a certain amount of skilled labour in working and considerable cost for maintenance; a system, moreover, which must involve the construction of a number of shafts, all of which, unless kept scrupulously clean, must become harbours for filth and a constant menace to the health of the patients.

If I were to presume to lay down rules for the proper method of warming and ventilating a ward, I should say, apply your warmth, or the greater part of it, around the outside walls of the ward, where the greatest leakage takes place; whether the method be by steam or hot water, take care that every pipe or coil is so placed that it can be cleaned easily and all round; if any arrangement is made for the admission of fresh air at the back of a coil, see that the shaft can be readily got at and cleaned; and let no shaft for the passage of air be longer than the thickness of the outside wall.

Before I leave this subject of ventilation, there is one special point it is necessary to notice. This is the sterilisation of air from fever wards. There is one kind of fever, and one only, of which it can be said that the sterilisation of air expelled from the wards is necessary in the interests of public health, and that is small-pox, a disease of which we have convincing proof that it can and does spread beyond the walls of the hospital; that the specific infection of it is in fact air-borne. And for this reason it is distinctly desirable that some means should be devised for rendering innocuous the air from the wards. The nearest approach to the accomplishment of this task has been made at the Bradford Corporation Hospital, where, under the direction of the architects, Messrs. Morley & Woodhouse, an apparatus has been constructed, and since patented by Mr. Edward Oldroyd. The system, to describe it very briefly, is this: Fresh air, capable of being warmed when necessary by passing over hot-water pipes, is admitted to the wards in the floor at the foot of each bed, and also at certain points in the opposite wall. The whole of the vitiated air is drawn from the ward through openings at the ceiling-level into a trench, at one end of which is a powerful furnace; part of this air is used to promote the combustion of the fire, the remainder being passed through the furnace and exposed to a temperature estimated to be 800 deg. Far. All the windows in the ward are hermetically sealed. For sufficient reasons I am not able to put before you any statistics as to the success of this system. The proof of success in an appliance of this kind is a matter for the bacteriologists and the microscope; and we have yet to see whether a ward constructed after this fashion fulfils every requirement, not only of the sterilisation of the air, but also as a suitable place for the treatment of small-pox. The point, however, I wish to impress upon you is that there is no justification whatever for applying such a system as this to wards for scarlatina, or any other infectious fever. The fact that scarlatina, the most important of these diseases, does not spread beyond the walls of the ward is well recognised; and this being

\* As Mr. Young quotes Sir Douglas Galton, we may draw his attention to another passage in the same book, as follows: "Whilst, however, it would seem to be in the highest degree imprudent to trust in any hospital entirely free from small-pox, there are conditions which tend to limit the air of large towns, in winter especially, which apparently can only be removed by a system of propulsion, combined with purification of the air from dust and fog by a system of air washing. These conditions are so eminently unfavourable to patients suffering from bronchial diseases, phthisis, or any respiratory trouble, that it would seem essential, if not essential, to provide at least one or two wards with such a means of purifying the air in general hospitals and workhouse infirmaries in large towns." It is to be feared, however, that this quotation would not have suited the general argument of the paper.—Ed.



so, the necessity for any system of sterilisation of air washes.

Our next point is that insanitary conditions may be produced by inadequate or ill-conceived arrangements for the removal of refuse. It can scarcely be necessary, nor indeed would there be time for me to enter in any detail into the principles of drainage. The methods of sound drainage are the same in a hospital as in any other building; and the neglect of them leads in both cases to similar disaster.

There are, however, some points special to hospital work which require to be noted; and there is other refuse besides what is carried away by the drains which equally requires to be disposed of with care. In every ward for acute disease there must always be a certain number of patients who are unable to get up, and who must perform every office of nature in bed. For the proper emptying and cleansing of the vessels necessary for these purposes there must be provided a sink, which is commonly called the slop-sink. The emptying and cleansing of these vessels is a duty which devolves on the nurse, and is one that is by no means free from danger. Enteric fever can unquestionably be contracted by a nurse whose hands get accidentally soiled, or who is perhaps not sufficiently careful while carrying out her work. The sink, therefore, should be so constructed that the risk of splashing is, if not abolished, reduced to a minimum, while at the same time a copious flush of water should be provided. The only slop-sink that I know in which the difficulties of the situation are intelligently met is the one devised by Professor McHardy, and called after him by the patentees, Messrs. Dent & Hellyer. The two diagrams kindly lent me by Mr. Hellyer show a plan and section of this sink. The bed-pan is placed face downwards, with its nozzle inclining towards the outlet of the sink, a jet of water is then projected upwards from the rose underneath the sink and flushes out the whole pan, the pan itself being held in position by the india-rubber strips at the sides of the sink. To flush out the sink there is a flushing rim, the water to which is turned on by a separate handle. There is a separate jet for flushing out urinals, and a metal cradle was devised for holding these vessels; but the latter is an encumbrance, and is not at all necessary. The room in which this sink is fixed should be of sufficient size to hold not only the slop-sink itself but an ordinary porcelain sink for washing other vessels, such as spittoons, porringers, &c., and sufficient shelving to hold the ward crockery. As a rule these rooms are made far too small for the work that has to be done in them.

In all sanitary fittings, including water-closets, sinks, lavatories, and baths, simplicity of form and cleanly appearance are desirable. They should also be, as far as possible, self-cleansing, and all casings of every kind should be dispensed with. In operation theatres, where, above all things, minute and excessive cleanliness is of the last importance, it is well to make all shelves of glass, not only that the state of the underside as well as of the upper can be readily seen, but also because glass is perhaps the only material not liable to injury from the acids used in the theatre. I have referred to kinds of refuse not liquid.

I mean by that not only the household refuse, dust, ashes, kitchen-stuff, and so forth, but ward refuse, such as bandages, dressings, poultices, and the like. In a general hospital the ordinary household refuse may be consigned to the care of the parish dustman; but it should be collected and stored in iron bins for which a suitable shelter and not near any ward should be provided, and it should be removed daily. Kitchen-stuff in a general hospital may also be separately stored and disposed of. But in a general hospital all the ward refuse, and in a fever hospital all refuse of every kind, should be burnt in a properly-constructed furnace. This furnace must be so constructed that the gases resulting from combustion are destroyed or decomposed before reaching the smoke-flue. Such an apparatus has been devised by Mr. Brophy, of the firm of Slater & Co., and is in use at the Middlesex and the London Fever Hospitals.

With regard to drainage generally, I will only add a word to impress upon you the extreme value of flushing. You can hardly have too much flushing power in hospital drains—or, for the matter of that, in any drains. If there is a laundry, the waste water can very well be taken to a flushing-tank, and utilised for flushing the drains by means of one of Mr. Roger Field's siphons. Of course, care must be taken to intercept the large quantity of shreds that invariably get detached from the clothes in the process of washing.

I now come to my last point, which was faulty arrangement of buildings. I have already indicated, when comparing the old and the new Lincoln Hospitals, the main features of mal-construction. What is called by Dr. Erichsen the "big house system" is the sort of plan upon which so many of the larger provincial hospitals and some of the London hospitals were built, notably University College Hospital, where Dr. Erichsen's well-known lectures on Hospitalism were delivered. In extreme contrast to this we have such a building as the Eppendorf Hospital at Hamburg, where every ward is an absolutely isolated building, and not even a covered way exists on the site. The enormous cost, both for land, buildings, and administration, of such a system could only be justified on grounds of absolute necessity. For myself, I fail to see the necessity; nor do I know of any sufficient reason for limiting the wards to one story in height, as is done at many other recent foreign hospitals besides the Hamburg one. Provided you so construct your wards that each ward is cut off from direct air communication with the other wards and with the other parts of the hospital, provided that there is ample open space for all purposes of light and ventilation, it seems to me to be quite immaterial whether they are two or three stories high. As an example of how wards should be isolated one from the other, I have here a plan of part of the new hospital now in course of erection at Derby. The wards are cut off from the corridor and from the staircase by short lobbies, which are, in fact, but covered bridges, with only just sufficient height for head room, and with free air space between the roof of one and the floor of that above. The corridor must, of course, be kept warmed at or about the same temperature as the wards; if this is done, and ample inlets for air are provided in the latter, there will be no suction of air from corridor to ward. The ward itself must be as simple in construction, and as cleanable in all its parts, as it is possible to make it, and should contain nothing but the most necessary furniture. Suitable store-rooms must therefore be provided outside the ward for food, for linen, and for patients' clothes, and an orderly closet for brooms, pails, and other things necessary for daily use in the ward cleaning. Mouldings must find no place in a ward or in any of its offices; angles, whether vertical or horizontal, must wherever possible be hollowed; in vertical angles to promote circulation of air and avoid stagnant corners, and in horizontal angles for facility of cleaning.

In the construction of ward-floors I think solid or so-called fireproof construction is essential—and after much consideration and comparison of different kinds of floor surfaces I am inclined to think that carefully-laid terrazzo is the best thing to be had. Hard-wood floors, laid in block fashion, are apt to tilt up with the weight of a bed, plus a heavy patient, and the joints, however well made, will open in places. Terrazzo, when well laid and when care is taken to have a sufficient thickness of concrete over the iron joists, gives a solid, homogeneous surface that is hard to beat. I know I shall be told that it is cold to the feet; but any slight inconvenience that may be felt from this cause can very easily be remedied.

A point of importance in regard to windows is that a window should always be put between the end bed and the end wall. This window may be as narrow as you like, but it must not be omitted. The necessity for this arises from the fact that these corner beds have been found to be less favourable to the well-being of patients than the other beds, owing, no doubt, to defective circulation of air round about the patient. The water-closets and sink-rooms must, of course, properly be cut off by cross-ventilated lobbies from the wards; this point is pretty generally recognised to-day. But what appears to be too often lost sight of is, that if it is necessary to take this precaution with regard to one closet, or set of closets, it is equally necessary to do it with every other. In a late competition for a large hospital I remarked several instances of the neglect of this obvious principle. In one case a two-bed ward had its closet opening practically into the ward, and in another otherwise excellent plan the water-closet for the use of the nurses opened directly out of the ward corridor.

I fear I cannot give you any counsel of perfection for the finishing of wall surfaces in wards. The perfect wall-surface has yet to be invented; meantime, I doubt if we can do better than a good Keene's cement surface painted and varnished.

If it is necessary to isolate wards from one

another, it is of vastly more importance to separate the out-patient department, the operation-room, the laundry, and the mortuary.

The out-patient department must be a separate building, and the only reason for any covered communication existing between it and the wards is, that the dispensary must be in touch with both. Or, to put it in another way, the dispensary must be part of the out-patient department, and to avoid having a second dispensary in the hospital proper, it must be also accessible to the nurses.

Equally necessary is it that the operation-room should be carefully isolated from all possible chance of air-borne contamination from any other part of the hospital. So far has this principle been carried abroad, that in one hospital in France the operation-room is a detached building in the garden, and patients are conveyed to it through the open air in a specially-constructed litter. This is carrying asepticism to an extreme that we should probably find would not be upheld by any surgeon in this country. But I think it will be agreed that where possible the operation-room should be a one-story building, and cut off by a lobby from direct communication with the main corridor.

Inside the operation-theatre, everything that makes for perfect cleanliness and consequent asepticism must remain supreme. A floor of the best terrazzo, walls either of marble or enamelled tiles, and well-painted and varnished cement ceiling, metal window-frames flush with the walls, and hard-wood doors, every part must be so made that the whole room can be if necessary swilled down with a hose. The fittings need careful consideration. For shelves the best material is glass, for reasons previously stated. Neither pipes or anything else must be fixed up against the wall so that they cannot be readily cleaned all round.

The laundry again must be an isolated building; it may be connected with the administration block by a covered way open at the sides, but even this I do not regard as an absolute necessity.

The mortuary building should be as far away from the rest of the hospital as possible. An essential part of the mortuary building is the post-mortem room, and here the aseptic precautions which in the operation-room are necessary for the sake of the patient, are, to a lesser extent, perhaps, necessary for the sake of the medical officer. A post-mortem room should be as cleanable in all its parts as an operation-room; and the materials used in its construction, while less costly, should be of a hard, non-absorbent nature. For the walls glazed bricks, and for the floors cement or asphalt are most suitable, while the table itself should be of a hard marble, polished, and supported on a framework of iron. The floor should be drained by an open channel provided with an efficient flushing-tank and covered with a movable iron grating.

In conclusion, let me try to summarise the essentials of hospital hygiene so far as the building is concerned. Perfect cleanliness in every part is the keynote, the beginning and the end of hospital construction, and to this every part must lend its aid. There must be no lurking-places for dust, no hidden recesses where foul things may be stored out of sight, no avoidable projections, or ledges, or mouldings to catch the dust, no cased-in pipes or shafts for foul linen or lifts.

The patients must be safeguarded from infection from each other, from the out-patient department, the laundry, and the mortuary; from the evil effects of ground-air, foul drains, or dust-bins. And in a word, every part of the establishment must be contrived with a view to facilitate that "exquisite perfection of cleanliness" which is the true secret of a healthy hospital.

Mr. Alexander Graham proposed a vote of thanks to Mr. Keith Young for his very lucid and admirable paper. The word sanitation, which was the key-note that evening, was a modern word, almost belonging to the present generation. When Sir John Pringle wrote on the subject 150 years ago, sanitary science, as understood in those days, was hardly a science at all. And he is credited with having said that he could more easily effect a cure in an old ruined building with broken windows, than in any hospital of his time. The lessons inculcated, however, did not have very much weight, for in the time of the Peninsular War the condition of things was very much the same, and it remained so until the close of the Crimean War. The first hospitals, which might be called proper hospitals, were military ones. He himself took Sir Gilbert Scott to Hounslow to show him one of the first hospitals built on sensible principles, and shortly



after that Scott designed the great Leeds Infirmary. Since then, he understood, many alterations had been made in that infirmary, and no doubt if Sir Gilbert Scott had copied the simple arrangements of the Hounslow Hospital the errors which had crept in at Leeds would not have occurred. Mr. Young had divided hospitals into different classes, but he had not sub-divided them into town and country hospitals. In designing a town hospital one was very much hampered for want of space. There was an old rule that not more than fifty beds should be put on an acre of land, but that was almost impossible in planning hospitals for large towns. The question of ventilation was of vast importance, but the difficulty was to avoid draught. To change the air three times an hour could be easily effected by ordinary means, but it was very difficult to lay down any fixed rule on the subject. In designing a hospital ward, floor space was a much better unit to work to than cubic space, because cubic space would regulate itself by height. De Chaumont had laid it down that over 12 ft. in height was unnecessary, and that experience showed it was impossible to control the air in an apartment of any great height. He was very glad to hear Mr. Young's remarks about natural ventilation. Experience taught them that if they trusted mainly to their windows and fireplaces they would always get a ventilating power at work both in summer and winter. In regard to the inlets, there was no difficulty, because in the case of the wards the walls would be external ones, and inlets could be put wherever they were desired. There was a great division of opinion in regard to where inlets should be placed; but it mattered very little; if they were low down where the pipes were the air could be warmed, while if they were a little above the heating the circulation was equally good. He was pleased to hear Mr. Young condemn some of the mechanical systems, for he never heard of one which was perfect in action, and he was sure they were very expensive. With regard to the necessity for sterilising the air of smallpox wards, he had no special knowledge, but recently where a fever ward had to be erected far from a smallpox ward, he advised that the smallpox ward should be taken down before the fever ward was put up. With regard to drainage, they knew that what applied to a house or cottage would apply equally well to a hospital. There was, in fact, no better school for the young architect to gain his experience in the drainage of an ordinary house than to have a small hospital to build, because he would not only profit by what he learnt from his own work, but he would come into contact with medical authorities and others, and in that way obtain a vast amount of information which would be useful to him in his general practice. The fittings of a hospital were matters on which there was a great diversity of opinion, but if there was one fitting that deserved success it was the very excellent slop-sink of Professor McHardy. Referring to floors, terrazzo he considered to be cold to the feet. He had never used any, because he had always advocated the use of teak for floors which had undergone the paraffin process. He would be glad, however, if the terrazzo floors answered the purpose for which they were intended. In one of the hospitals of New York he noticed tiles used for ward floors, and being red they had a warm appearance, but he felt they must be cold for patients. As to walls, he was glad to hear Mr. Young advocate a Keene's cement-surface, and the painting and varnishing of such a surface was, in his opinion, the best mode of treatment. The use of glass had extended very much, and shelves made of that substance should always be used if possible. He believed that glass had been utilised for the walls of operating-rooms, but he was not aware whether it answered. With regard to mortuary buildings, nothing could be better than the use of glazed bricks and asphalt for floors recommended by Mr. Young, with plenty of means of flushing. There was one matter he could not help thinking they should always bear in mind, though, perhaps, it might be a question of sentiment more than anything else. They should remember, in planning their structures, that a mental influence was exercised on people in bad health by cheerful objects out of doors. It was well, for instance, that the patient should not be able to see anything ugly in the surroundings. There were plenty of cheerful things to be seen in a ward, and, if there was any ugly object outside, it was better that the ward should be so placed that the patient should not notice it. Some time ago he was called upon by a committee in a country town to advise about the plan of

a small hospital. Before looking at any of the designs, he went to inspect the site, when he found that a very strong shadow was cast on it by high buildings close to the boundary. He made a sketch of the shadow, and decided that it should not enter the wards, for the moving of a black shadow across a ward would not help sick persons towards recovery. He went again in the afternoon, and marked the shadow, and afterwards suggested that the building should be shifted, so that the shadow should never be in the ward. In all hospital planning, young architects were apt to consider their elevation first, and their planning afterwards. The plan was everything, and when that was finished, with all the doors, windows, and every detail that might contribute to the well-being of the hospital fully considered, a good architect would then be able to make a satisfactory elevation under any circumstances.

Mr. Gordon Smith remarked that in one sense he could not claim to be a high authority on hospitals, for he had never built one. He had seen a great many, certainly, and had taken a great deal of interest in the subject, and he had had occasion, during a somewhat long career, to discuss hospital arrangements with a great many architects and medical authorities. He felt almost afraid to touch upon the important question of ventilation, because, whatever one said in regard to it was apt, in these days of competition, to be slightly distorted. In the main, however, he endorsed all that Mr. Young had said in his condemnation of mechanical ventilation, and he felt that the best system was to depend almost entirely upon windows, fireplaces, and doors. In any reasonably well-constructed ward, with the usual amount of windows properly arranged, there should not be any difficulty whatever in effectually ventilating the ward, without any appliances other than those referred to. There was sometimes a little difficulty in getting people to open the windows sufficiently, but there ought to be in every hospital someone to act as an officer of hygiene, whose duty it should be to see that all the details put there by the architect were judiciously used. He would like to suggest also that, when the architect finished the building, he should leave carefully-prepared printed instructions as to how the various appliances should be used. The sterilisation of ward air had been referred to, but he did not think there was any occasion for it, except in the case of smallpox wards. There was no need for it in other wards, and as far as efforts had been made, hitherto, to effect such sterilisation, he believed they had only been attended with partial success. He would like to support what Mr. Graham had said in regard to cubic space. Certainly the floor space, and the distance apart of beds, were the chief factors, and they came distinctly before cubic space. When the Local Government Board were preparing the revised instructions about infectious hospital construction, they accepted the generally-recognised amount of cubic space per patient at 2,000 ft. It had been always laid down that there should be 444 square feet of floor space and 12 ft. of wall space to each bed. That was on the supposition that the wards were to be 24 ft. wide, with a 12 ft. wall space to each bed; but in order to make up the 2,000 cubic ft. a height of 14 ft. was required. In revising this arrangement, it was decided to recommend that the width of the wards should be increased to 26 ft., and their height reduced to 13 ft., and thus the patients get the advantage of increased floor space without any diminution of cubic space. In regard to cleanliness, there was a good plan adopted in one or two foreign hospitals he had seen, but which would probably be very difficult to adopt in this country on account of the cost. That was to arrange hospitals so that they might always have a vacant ward lying "fallow," the windows being left for a time continually wide open, thus allowing the ward to be thoroughly aerated. In conclusion, he had very much pleasure in seconding the vote of thanks to Mr. Young.

Dr. Pasteur (Lecturer on Public Health at the Middlesex Hospital) said he had listened with great interest to the admirable discourse of Mr. Young, and it had struck him how thoroughly that gentleman had grasped what it was most essential that all architects should grasp in constructing hospitals—namely, the nature of the dangers one had to guard against. It was of paramount importance to attain cleanliness; not cleanliness in the ordinary sense of the word, but, a degree of cleanliness which would stand the test of the microscope. Everything must be clean, from the air supplied to the wards to the materials of which the wards were constructed. It was not only necessary that these should be

clean when put down, but that they should continue clean. Hence the importance of using materials which were as far as possible non-absorbent for facing and flooring wards. If that was done, it seemed to him that a "fallow" ward should not be necessary, because non-absorbent walls, &c., could be cleaned so as not to require the ward to be laid by for a certain period. The examples of the monstrous iniquities that had been brought before them in connexion with the Hôtel Dieu and of the old Lincoln Hospital were fortunately things which could not occur in the present day. No doubt they came in contact with many examples of harm done to hospital inmates through defects of construction or faulty arrangements. He believed there was not a hospital physician or surgeon who did not know of certain wards or beds with a shady reputation, which could be traced to some neglect in administration or some fault of construction. He had known of a bed in which patients were constantly getting erysipelas. The matter baffled inquiry for a long time, until a layman discovered the cause, in the shape of a dust-bin in the area, just below the window which opened on to the bed, and on the removal of this dust-bin the erysipelas disappeared from that bed. Not many years ago he had to inquire into the cause of recurrent outbreaks of diphtheria in the wards of a London hospital. In this case there was not much difficulty in finding faulty sanitary arrangements. When the drains were put right the diphtheria disappeared entirely from one of the wards, but in another ward, where disinfectants continued to prevail, nothing appeared to remove it until the flooring was ripped up, the space between disinfected, and a parquet flooring put down. With respect to the terrazzo flooring, he had the pleasure not long since of visiting, with Mr. Young, the magnificent infirmary of which the plan was in front of them. He had been delighted with almost everything he saw in this very perfect hospital, but confessed he had had an unpleasant impression on walking over the hard and cold ward floors. Their hardness constituted a possible source of serious injury to patients falling or throwing themselves out of bed. He did not know if these floors were non-absorbent. If they were not, this would, in his opinion, constitute another objection to their use. In conclusion, he believed that the man who looked most into the details of hospital construction, and troubled himself about them, would obtain the best results—i.e., build the healthiest hospitals.

The Chairman said they had had a good deal of opinions reflecting on mechanical ventilation, but there was a gentleman present who, he believed, was rather in favour of them. He referred to Mr. Henman, of Birmingham, now building the large General Hospital there.

Mr. William Henman had much pleasure in supporting the vote of thanks to Mr. Young for his excellent paper which embraced so many subjects requiring attention if good sanitation was to be secured in the design and construction of hospitals. One point of importance had not, however, been alluded to—that of aspect. It was a question upon which hospital architects, so far, did not appear to agree, but he was decidedly of opinion that in this country pavilion-wards should run as nearly as possible north and south, so that the sun's rays may fall on both sides—during part of the day at least. He was not sure that Mr. Young had adopted the best material in the Derby Infirmary for the floors of wards, for even if terrazzo was a substance impervious to moisture it was liable to condense moisture upon its surface, when there was a rise in temperature after a period of cold weather, unless the floors were heated from below, as was done on the Continent, and he feared that the health of the nurses might suffer from standing so long upon the cold hard surface unless supplied with slippers of more non-conducting material than they generally used. With regard to wall surfaces he had recently paid considerable attention to them, and had come to the conclusion that the employment of glazed materials was, generally speaking, a mistake. External walls were exposed to greater variation in temperature than even floors, and more readily condensed, not only the ordinary moisture in the internal atmosphere of the ward, but also the breath and exhalations of the patients, and therewith that organic matter which, with a proper system of ventilation and with walls of an anhydrous, and therefore naturally warmer, substance, would be expelled by change of atmosphere. He had passed his hand over glazed wall surfaces and been surprised to find what an amount of dirt had really accumulated upon what appeared to be a clean



surface, and had also noticed moisture trickle down the face of glazed brickwork, and on arriving at a joint, being absorbed with all the impurities carried with it. At that late hour of the evening he scarcely dared enter upon the subject of ventilation, which was a large and very important one, and one on which he ventured to differ entirely from the views expressed by Mr. Young. He could only touch upon the subject at present, but those interested in the matter might ascertain his views more fully by perusing the paper he had read before the Leeds and Yorkshire Society of Architects, and which was published in the *Journal of the Royal Institute of British Architects* in the spring of this year. It appeared to him that a certain black pamphlet bearing a red cross on white ground, written he believed to prejudice people against what he and others were doing to practically utilise a scientific method of ventilation—must already have had effect upon the minds of previous speakers.\* He had examined into all the systems and methods in use, and had visited a large number of hospitals for the purpose of ascertaining whether the so-called natural system did duty properly. In most cases he found the verdict against it, particularly at night, and when, as very frequently happened, the windows cannot be kept constantly open, then it was that wards got dreadfully stuffy. In Birmingham and other large cities the ordinary atmosphere was dirty and contaminated with manufacturing fumes, and the question therefore arose whether the air could be cleansed, and an adequate change be effected throughout the buildings by mechanical means. Mr. Young had spoken about a change of air three times per hour, but although that might be all which could be secured by so-called natural ventilation, without creating draughts, it was nothing like sufficient; yet he could assure them that by mechanical means, properly applied, it was possible to change the air of an apartment ten, twelve, or even fifteen times an hour, without causing unpleasant draughts. This he had proved by experiment in a building he had had specially erected. Two rooms of exactly the same size were equally supplied from one air-duct. In one room, provided with what he called a "spreader," one might sit in comfort for an indefinite time. In the other room, without such an appliance, it would be uncomfortable to remain even half-an-hour. This proved there was much in the method of applying any system of ventilation, and he did not doubt that by defective application in the past mechanical ventilation was now unjustly condemned; experience had, however, proved it could be successfully and economically applied. He was very glad the previous speaker had referred to particular beds in certain wards being unhealthy, and to the causes to which such had been traced, because such cases proved conclusively to his mind the necessity for a scientific system of ventilation by propulsion, to replace the haphazard means commonly, but erroneously, called natural, by which air—good or bad—was sucked in from no one knows where. In considering this subject in connexion with the new Birmingham General Hospital it was not only a question of having reliable ventilation throughout the buildings, but one of cost, and on that point the committee feel satisfied, because as a set-off there is a great saving of daily labour. There being no fireplaces, no coal had to be carried about; dirt was avoided, and no dustbin was required; and as there were neither steam nor hot-water heating-pipes in any habitable part there were no inaccessible places behind, where dirt could accumulate. As to the ducts and flues, they were all of large size, readily accessible, and provided with means for periodic cleansing. No trouble has been experienced in the several buildings in which the system has been carried out as it will be in the Birmingham Hospital, yet in some it has been in operation for the last three or four years. With regard to the purification of air passing out of hospitals, he agreed it was necessary, except for smallpox and possibly fever-wards, as only negative evidence had so far been forthcoming that scarlet fever and other diseases due to germ life are not conveyed by the atmosphere. In the case of smallpox it was essential to purify the air, it having been ascertained that it was undoubtedly conveyed by the atmosphere. His proposition was to adapt the system of air propulsion, and to place at the head of every bed an outlet with a screen somewhat similar to the screen used at the inlet, for it had been proved by careful

bacteriological examination, that such screens eliminated germs from the atmosphere. In the building he had mentioned he was carrying out further experiments, and hoped to demonstrate that it is possible to purify the outgoing as well as the incoming air, and in time to communicate the results of his experiments.

Dr. E. A. Fardon (Resident Medical Officer, Middlesex Hospital), remarked that he was extremely pleased to be able to follow the last speaker in regard to ventilation, because he appeared to be the only one who had ventured to speak with certainty as to his belief in the adequacy of artificial ventilation. He had never seen an artificial system which had been generally approved by the people who had to use it. He believed the importance attached to draughts or unequal temperature in wards of general hospitals was rather apt to be exaggerated, and there was little risk of the patient, under ordinary circumstances, catching cold when the surface of the skin was adequately protected from chills. As to air-space, the cost of the site would be very large in a city, and he knew of well-managed hospitals with certainly not more on an average than from 1,000 to 1,200 cubic feet of air per bed, where the results were as good as where there was double or treble that space allowed. Terrazzo was a beautiful substance for corridors, but when laid down for any length of time it was liable to fissure and fracture. He much preferred for wards a solid teak floor, well put together and subjected to some process to render the wood impervious. Walls with a glazed surface were usually damp, and took up dust. Cement covered with several coats of paint, and varnished, presented an admirable surface, but unless it was kept rubbed and polished the varnish was apt to deteriorate in time under the effect of the London atmosphere. For that reason he liked to see a wall painted and varnished to the height of an ordinary dado, which might be reached by the hand, while above was a distemper which could be renewed periodically. He might add that he was practically in accord with nine-tenths of what Mr. Young had said in his interesting paper.

Mr. Cole said he believed somewhat in mechanical ventilation, and with modern appliances a great deal more might be achieved than had been done in the past. For both inlet and exhaust an electrically-driven fan could be used at a small cost, and with the minimum of attention. He agreed that a painted and varnished dado with distemper above acted well for the walls of a hospital.

The vote of thanks on being put to the meeting, was carried by acclamation.

Mr. Young, in replying, said he should not attempt to follow Mr. Henman in his remarks on ventilation. There were several hospitals abroad with either cement or terrazzo flooring. The flooring at Derby was an experiment, undertaken under the advice of the medical staff, who had given considerable attention to the matter. One of the staff went to Hamburg and found the hospital there had its wards floored with terrazzo, though they were also under-warmed. If terrazzo flooring was proper for the patients, the nurses could easily wear suitable shoes. The utmost possible credit was due to Mr. Henman for the great pains he was taking to arrive at a definite knowledge of what artificial or mechanical ventilation was going to do, and he, for one, would look forward to seeing the results of the work at Birmingham with exceeding interest. He had a perfectly open mind in the matter, and only wanted to do the best that could be done for the patients. A remark had been made about the evidence of the spread of infection from fever hospitals being merely negative, but there was certainly positive evidence that scarlatina did spread beyond the walls of a hospital.

The proceedings then terminated.

#### COMPETITIONS.

**PUBLIC LIBRARY, HAMPESTEAD.** The Public Library Commissioners for Hampstead held this week held a public examination of the plans and elevations of the proposed central public library, Hampstead, for which a site has been secured at the corner of Arkwright-road and Finchley-road. The competing architects are Messrs. Basil Champneys, Horace Field, T. Graham Jackson, and Arnold S. Taylor.

**TOWER BRIDGE COMMEMORATION MEDAL.** The result of the competition for models of a medal to commemorate the opening of the Tower Bridge by the Prince of Wales has just been made known. The first premiated design is by Mr. F. Bowcher, 6, Clifton Hill Studios, St. John's Wood; the second being by Mr.

G. G. Adams, F.S.A., Acton Green Lodge, Chiswick.

**WEST OF ENGLAND EYE INFIRMARY.**—The Committee of Management of the West of England Eye Infirmary at Exeter are proposing to erect a new building on the site of the present premises in Magdalen-street, and in August last they invited architects to send in designs in competition on instructions issued. These designs were to be delivered on November 30. The committee have appointed Mr. Charles Barry, F.S.A., as their assessor to advise them in the selection of the most suitable design. This competition is to be a dual one. From the designs sent in at first (which are to be to a scale of 16 ft. to an inch), not fewer than three, or more than six, will be selected by the assessor for the final competition (drawings to be 8 ft. to the inch), and to each of the architects so selected an honorarium of twenty-five guineas will be paid. The successful architect in the final competition is to be employed as architect to the building on the usual professional terms. The work is intended to be commenced at once, but if its commencement should be delayed for two years after the award, the architect is to be paid 100 guineas (in addition to the honorarium), and his design will then become the property of the committee.

**MUNICIPAL BUILDINGS, COVENTRY.**—The City Council of Coventry are about to invite designs for complete Municipal Buildings, which are to embrace the old historical St. Mary's Hall and some other ancient buildings which have for many years been used for municipal purposes. They invited by advertisement architects who had had some experience in similar work, and who were willing to compete, to send in their names with drawings or photographs of their executed works, and twenty-five names were sent in. The City Council have selected eight of the applicants, who, together with any Coventry architects who might desire to compete, will be supplied with the necessary instructions and plan of the site available. The City Council have been advised in the preparation of these instructions by Mr. Charles Barry, F.S.A., and have appointed him as their assessor in the selection of the best designs.

#### ARCHÆOLOGICAL SOCIETIES.

**BRITISH ARCHÆOLOGICAL ASSOCIATION.**—On the 21st ult. a meeting of the British Archæological Association was held, the Rev. J. Cave-Brown, M.A., in the chair. Mr. Way exhibited a series of antiquities, mostly found in Southwark, the most curious being a hand-pistol for the discharge of needles. There was also a bronze stylus of Roman date, having a spoon at the opposite end for melting wax for the writing-tablet. Dr. Fryer exhibited an inscribed ring found at Tyre. Mr. Loftus Brock, F.S.A., in referring to the number of jettons found in Europe, exhibited some procured on the Continent, struck by various municipal and corporate bodies for public use. Mr. Symons sent particulars of a curious article of pottery found at Hull. Lady Simons forwarded drawings of some crosses of very early date which have been met with at Lerwick. They are sepulchral in character. Mr. Metcalfe described a remarkable chest of Italian work which is now preserved in Sherborne Castle. Drawings of an early Norman inscribed tomb, with a description, were laid before meeting by Mr. C. Lynam. It is in Adderley Church, Salop, where an interesting and little-known monument of a priest exists in the modern building. A paper was then read by Dr. Fryer, on the discovery of manganese from abroad, which has been found near a smelting furnace attached to a Roman building near Cardiff. The chairman read a paper on a list of witnesses, appended to the records of a trial, 1176, relative to lands in the Isle of Thanet. It is of much local interest, since the names are 123 in number. The records form part of Campbell's Charters, in the British Museum, recently investigated by Mr. de Gray Birch, F.S.A. A paper was then read by Mr. R. B. Barrett on the ancient buildings on the Rock of Cashel, the cathedral, Hoar Abbey, and the remains of Holy Cross being described in detail, and their present condition referred to. The paper was illustrated by elaborate plans and drawings of the subjects described.

**SURVEYORSHIP APPOINTMENT.**—The Madron (Cornwall) Local Board and Urban Sanitary Authority have appointed Mr. J. Wm. Trounson, of Penzance, as Surveyor, and given him instructions to prepare the necessary plans, &c., for a water supply and sewerage scheme of Hea Moor District.

\* They must be very ill-informed people, then, to be taken in by a very most popular and well-illustrated trading firm.—Ed.





Tewkesbury Abbey.  
The Choir, from the West  
Presbytery from the East

### Illustrations.

#### TWEEKSBURY ABBEY.\*

THE major portion of the present Abbey Church of Tewkesbury dates from the Norman foundation of FitzHamon in 1087, during the abbacy of Geraldus. The church was consecrated and dedicated to the Virgin on November 20, 1123,† having been completed by Earl Robert, brother of Henry I., who married Mabel, daughter of FitzHamon, and thereby succeeded to the manor of Tewkesbury. It consisted of a nave of nine bays, with aisles, a north porch, a lofty central tower, aisleless transepts, with eastern apsidal chapels and a Presbytery of two bays, with a semi-hexagonal apse. The form of the later additions suggest the possibility of chapels projecting from the ambulatory, as at Norwich; but of that there is no existing evidence. The nave remains in its original state, with the exception of later windows and vaulting, and bears a strong resemblance to the nave of Gloucester Cathedral.‡ The central tower also stands, forming one of the finest examples in England of its period. The chapel eastward of the south transept exists, but the corresponding chapel on the north has been destroyed, to make room for larger chapels at a later period.

The second of the three great families who held the Manor of Tewkesbury was that of De Clare. Gilbert de Clare succeeded to the honor of Gloucester in 1221, and the Tewkesbury Manor remained in the De Clare family until the death of the tenth Earl, Gilbert, at the Battle of Evesham, 1265. The De Clare graves are still below the pavement of the Presbytery, arranged side by side opposite the "Warwick" chantry. The only stone remaining in the pavement is the matrix of the fine brass of Maud de

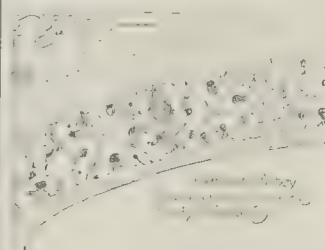
Burgh, widow of Gilbert (iii.) de Clare. She died 1315. The graves were all carefully examined during the progress of the late restoration (1875).

The only portion of the Abbey Church which belongs to this period is the Chapel of St. Nicholas at the north-east angle of the north transept. The building originally extended the full length of the north front of the transept, and was entered from it by a deeply-moulded arch, the full thickness of the Norman wall, which has recently been opened out and restored. Unfortunately, what might be termed the nave of this chapel has been destroyed, but the traces against the transept-wall show it to have been divided into four equal bays and vaulted. At its north-east angle, incorporated with what now serves as a buttress, is a respond showing that this portion

The present or eastern part is known as the Chapel of St. Nicholas, the destroyed portion that of St. Eustachius. It has been called also the Chapter House and the Lady Chapel. At Bristol a chapel known as the "Elder" Lady Chapel is attached to the east wall of the north transept, and bears some resemblance in its detail to the one at Tewkesbury.

It was, however, during the third period of its history that the Abbey church underwent the most considerable changes. For the hundred years between 1314 and 1414 the manor was held by the Despencers; Eleanor de Clare, to whom the manor of Tewkesbury and the honor of Gloucester came, having married Hugh le Despencer the Younger, created by Edward II. Earl of Gloucester. With the exception of the Norman columns of the presbytery and apse, and a portion of the outer walls with their responds, the whole of the Norman work was removed, and replaced by an elaborate Decorated Presbytery of great beauty. The Norman circular columns were raised about 3 ft. and richly-moulded arches placed upon them, carrying a clearstory with triforium gallery passing below the windows, and through the walls at the angles. Each window was of five lights, that facing east having a wheel in the head, and all were filled with glass of the period. Rich sedilia were placed in the canted bay of the apse, on the south side of the altar, and stone screens divided the ambulatory from the series of five semi-octagonal chapels which were thrown out from it. Eastward projected a Lady Chapel, now unfortunately destroyed, and a chapel, dedicated to St. James, was built on the site of the Norman chapel, eastward of the north transept; the south wall of the Early English chapel, already described, was pulled down, and a Decorated arch put in its place, thereby throwing it into the later work. The presbytery was vaulted, and also the nave and transepts.

The Perpendicular period is represented by the remains of the cloisters, the doorway to them from the nave, two or three of the monuments and chantries, and the tracery of the great west window. Additions of a still later period include the angle buttresses north-west and south-west of the transept, the west doorway and flying buttresses on the north side of the nave at



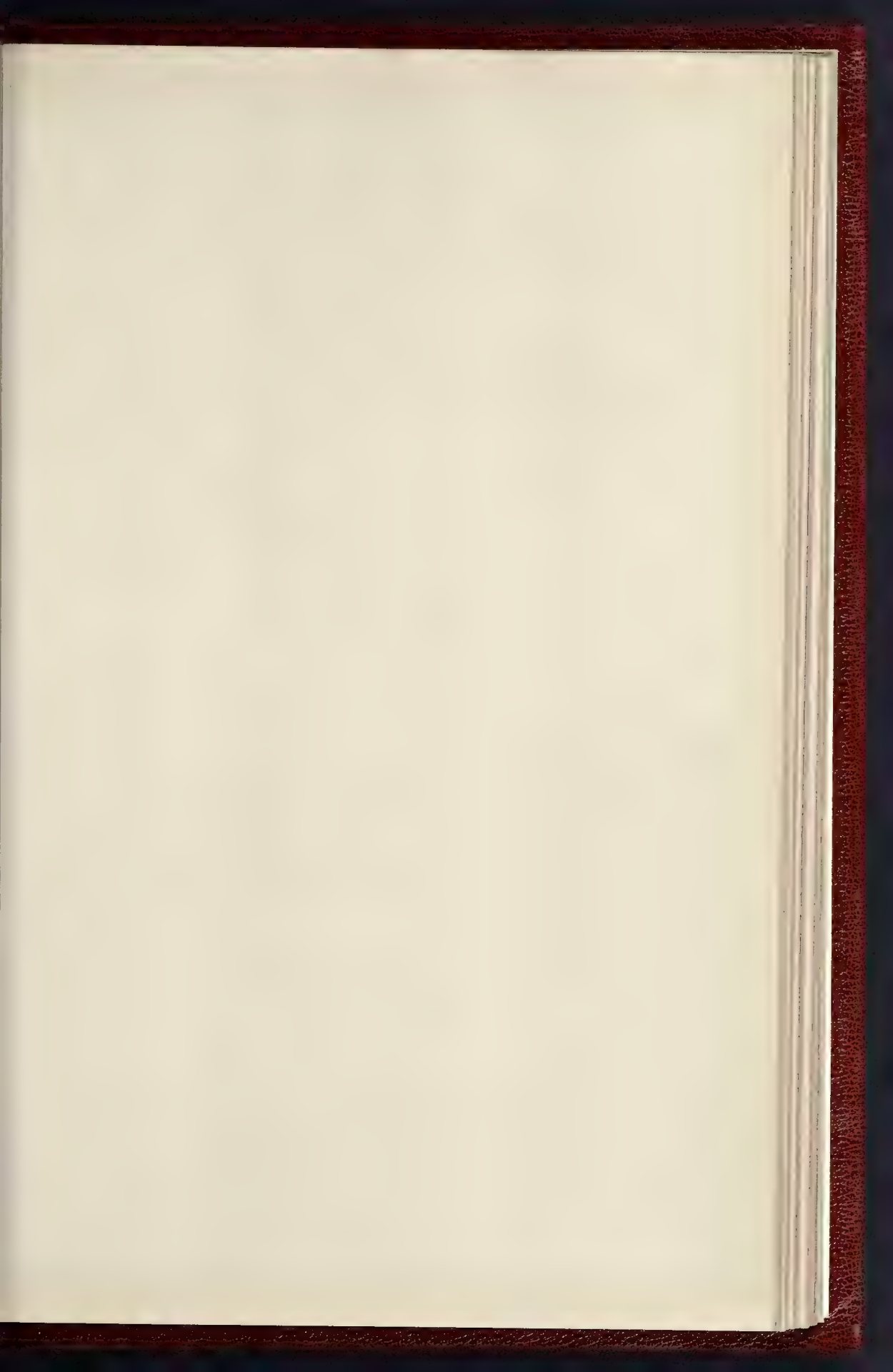
was arcaded on its north side. The chapel is at this point spanned by a fine pointed arch, subdivided, and having a central column. All east of this remains in fairly perfect condition, and retains its vaulting and its wall arcading on the north; the windows, however, being insertions of Decorated date. On the south, almost at the angle of the Norman transept, are the remains of the pillar buttress, corresponding to that existing on the north side, and showing conclusively that this chapel stood out clear of any other building, and existed before the Norman Chapel of the transept was destroyed. Its use has, we believe, never been satisfactorily explained.

\* The series of the "Abbeys of Great Britain" is continued this month with illustrations of (No. VII.) "Tewkesbury." Particulars of this and of the three Cathedral series ("England and Wales," "Scotland," and "Ireland") will be found on p. 1.; also of the forthcoming re-issue, in book form, of the series of "English and Welsh Cathedrals."

† Rev. T. H. Daniell: "Tewkesbury Abbey and its Associations."

‡ See *Builder*, December 3, 1892.





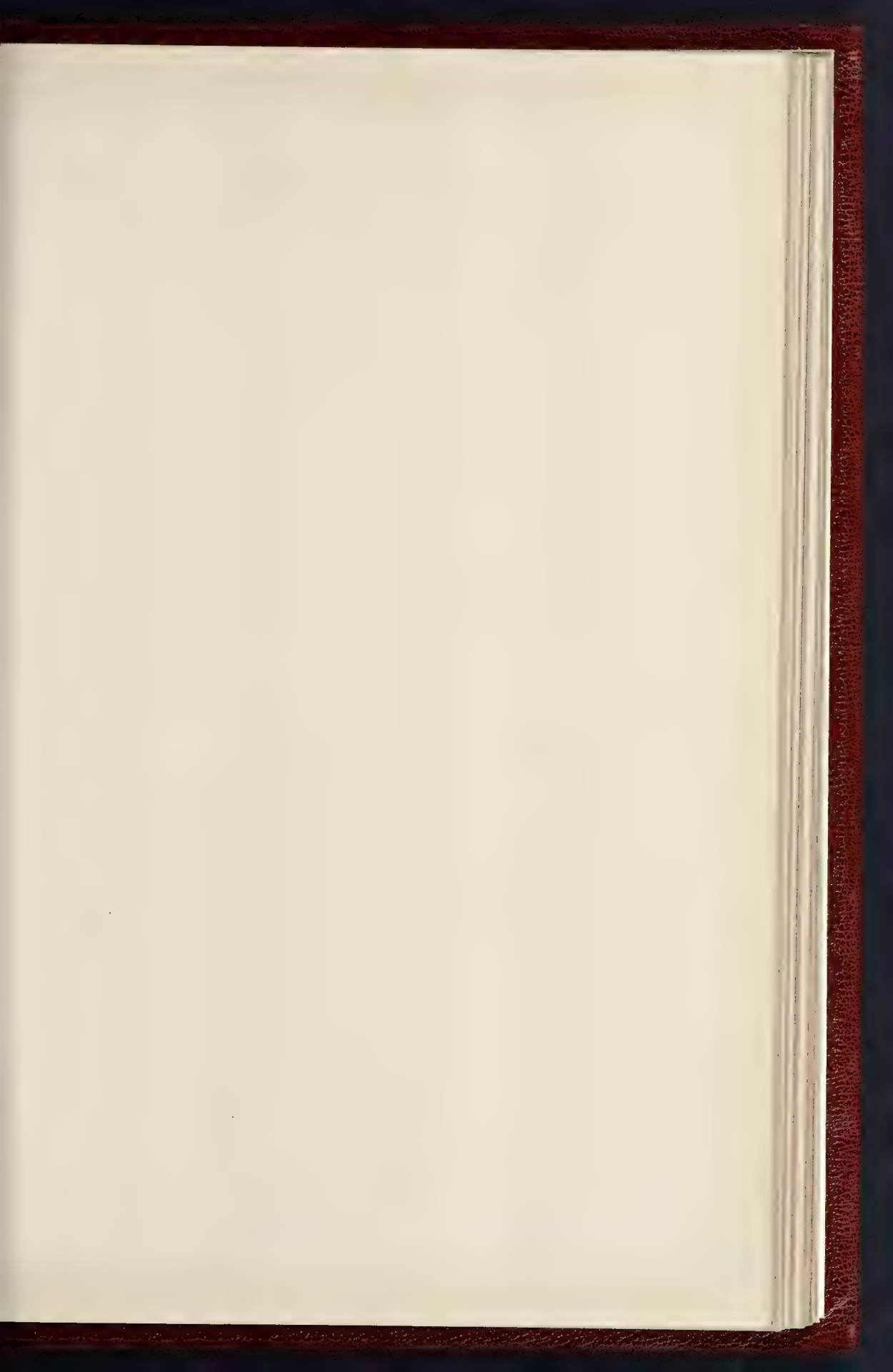


WINDOW, OLDBURY CHURCH SALOP BY MR ALFRED O. HEMMING

*And Anthony Evans, 1894*

MA PHOTOGRAPHED BY J. H. & EAST HARDING STREET FETTER LANE E



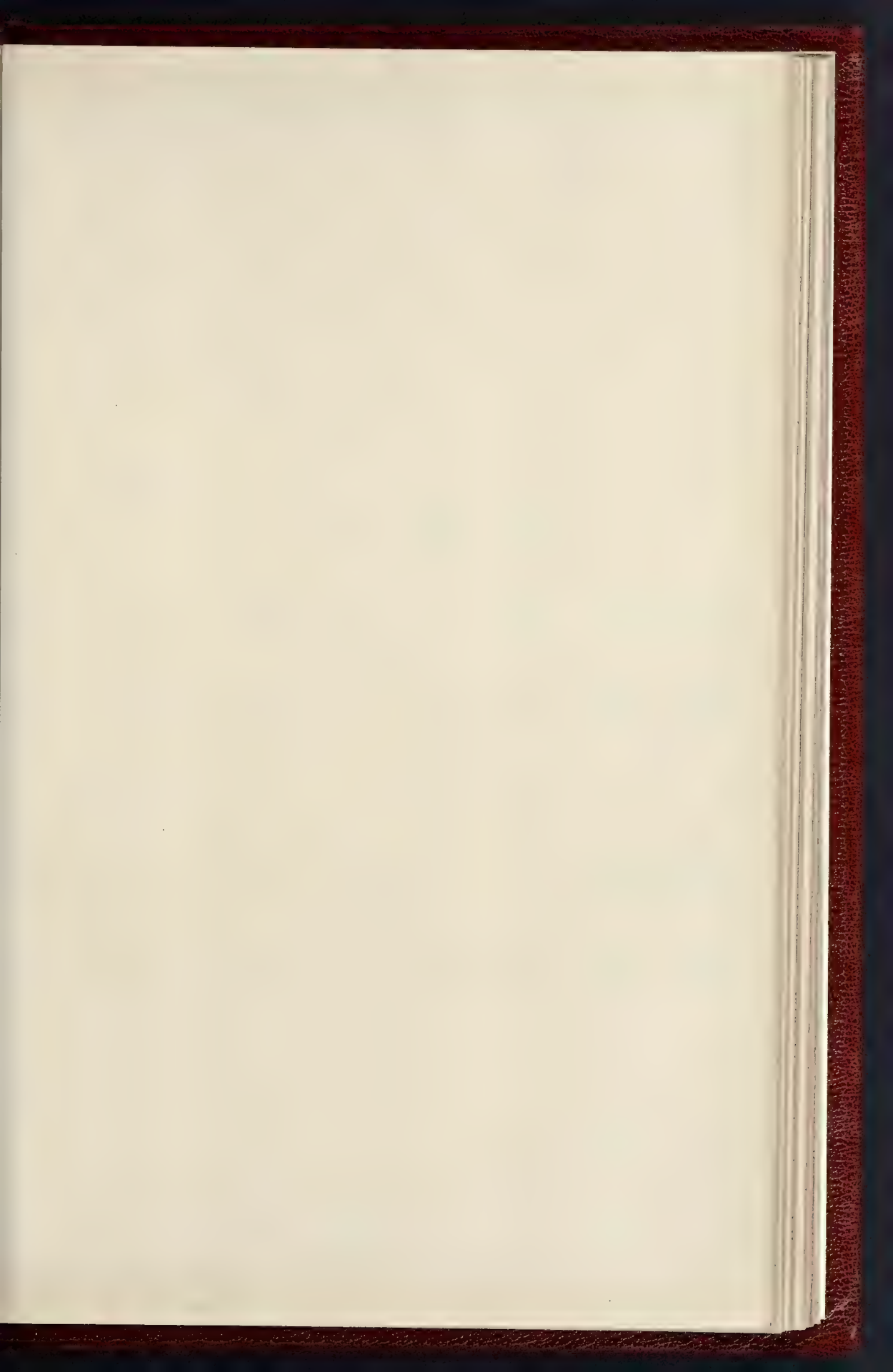


S. Nicholas, Brunswick

Revd. 1894

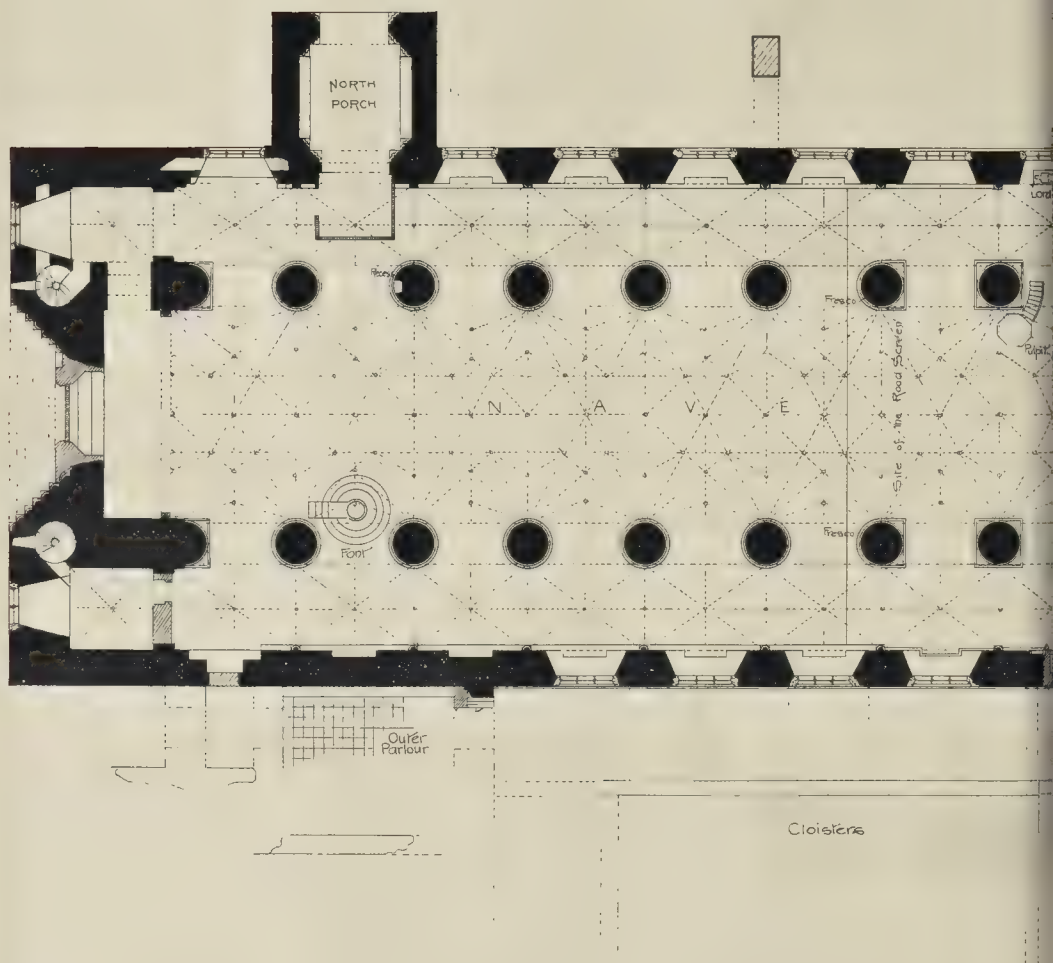
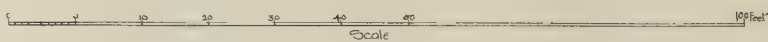




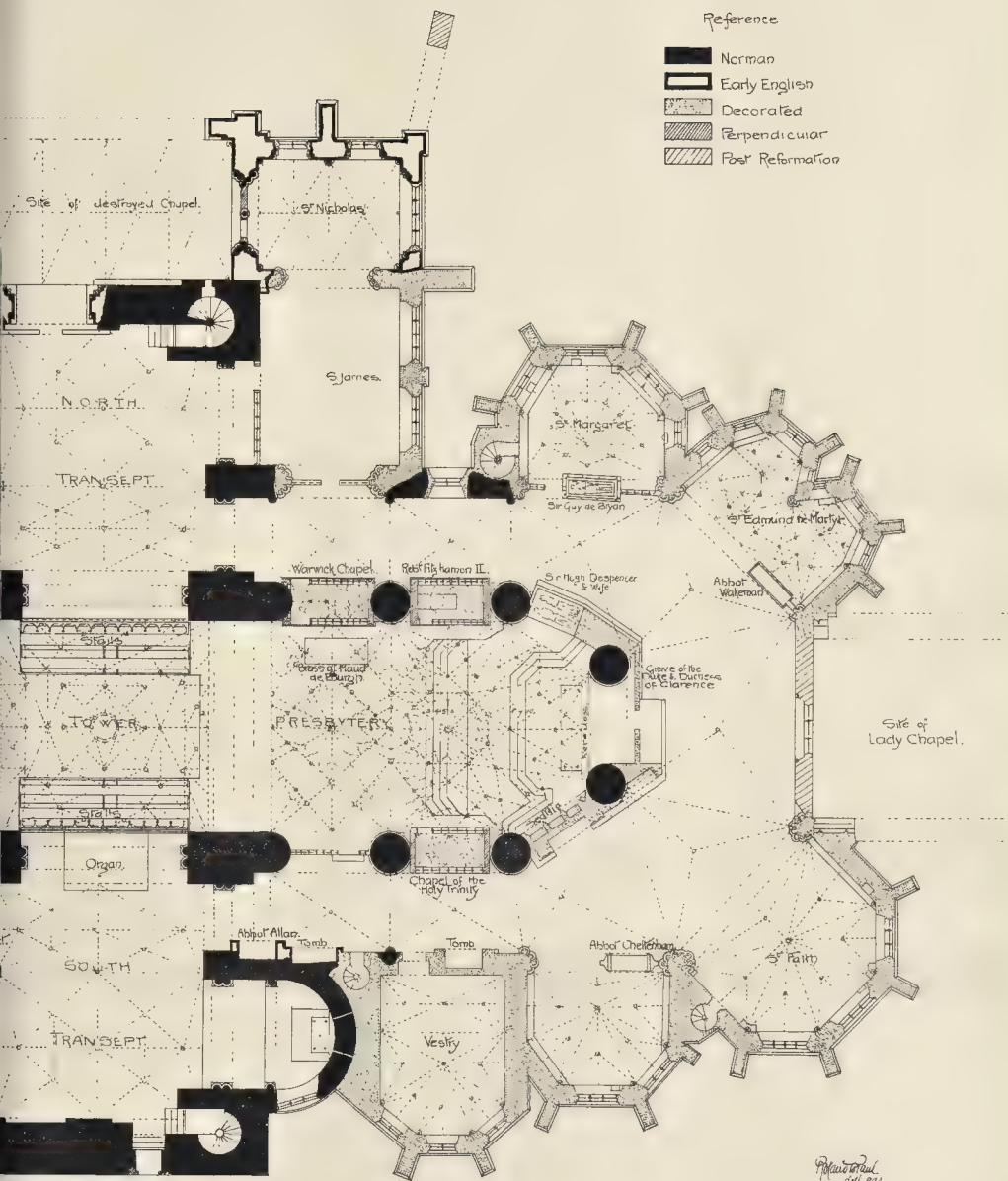


## TEWKESBURY ABBEY CHURCH.

Ground-Plan













THE BUILDING, DECEMBER 1, 1894







THE ABBEYS OF GREAT BRITAIN.—No. 7. TEWKESBURY: INTERIOR OF NAVE, LOOKING EAST.

DRAWN BY MR. J. H. SLATER

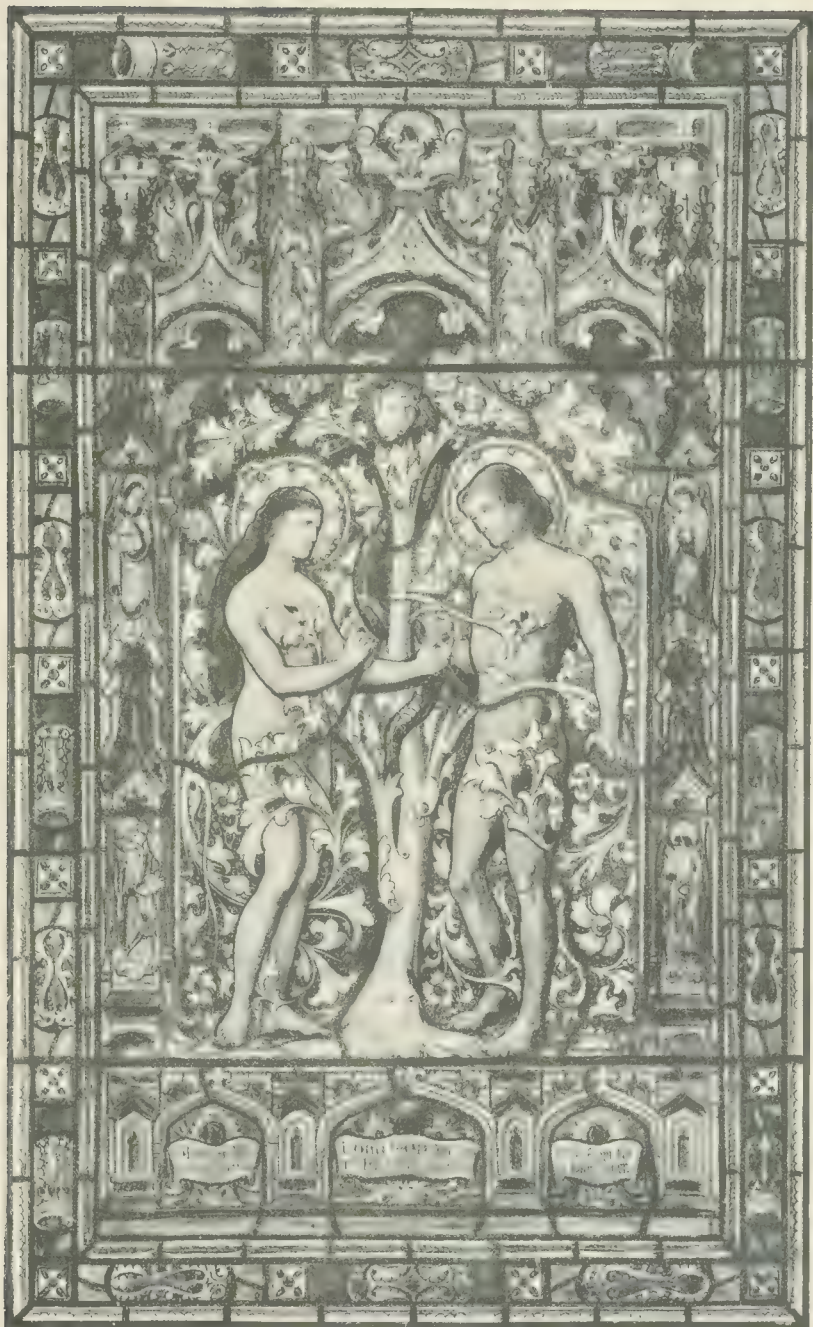












INK PHOTO SPRAGUE & CO 48 & 5 EAST HARDING STREET FETTER LANE E.C.

DESIGN FOR STAINED GLASS—By MR P H NEWMAN







the north-east angle of the Early English chapel, and at the eastern angles of the clearstory of the choir.

Between 1875 and 1879 the building underwent a thorough restoration by the late Sir G. G. Scott, and from that time to the present sundry additions have been made. The most noticeable are the pavement and steps of the sanctuary, the modern stalls (with the old Decorated backs incorporated), a pulpit on the north side of the nave, the font (the stem of Decorated date reused) raised on four steps, placed opposite the north porch against the south arcade, and the wooden screen quite recently erected between the western tower piers from designs by Mr. J. Oldrid Scott.

The ground-plan given in the present issue has been brought up to date, and shows the present arrangement of the fittings, and the Early English arch opened in the north wall of the transept.

In addition to the general character and the gradual growth of the building already described, the following points may be noted. *The nave.*—The west front, a well-known one from its fine Norman arch of seven orders (six of which project clear of the Perpendicular wall inserted), is flanked by Norman turrets rising two stages above the roof, and crowned with small spires circular on plan (an illustration of this front, from a drawing by the Editor, was published in the *Builder* of Jan. 3, 1885). The aisle windows are like the others in the nave insertions of Decorated date. Against the south wall are traces of the walls of the "outer parlour," and a doorway, now blocked up, which led to it from the south aisle. A portion of a Norman return wall still exists, showing that the Perpendicular cloister was the same as that of the Norman church. The cloisters themselves were of very rich Perpendicular work, with elaborate vaulting, as at Gloucester Cathedral. One of the jambs of the Norman cloister door remains inside, just west of the Perpendicular one (this is shown in a view published in the *Builder*, December 18, 1886, which also includes the monument eastward, known as that of the Duke of Somerset). In the nave the chief points are the late arch inserted in the westernmost bay of the north arcade, a recess (perhaps for a stoup) in the west face of the column opposite the north porch, and the traces of the rood-loft and frescoes

on the second columns westward of the crossing. At the east end of the north aisle is a tomb ascribed to Lord Wenlock, but considered by Mr. Hartshorne, from a study of the effigy, to be that of Sir John de Lugtburg. On the south side are the "Somerset" tomb and cloister doorway already noticed.

Both transepts are very plain Norman, with later Decorated vaulting. In the north transept is the fine Early English doorway which led to the chapel on the north, and in the south transept is a Perpendicular recess in the west wall, and the apsidal Norman chapel on the east side, now used for morning services.

The stalls are arranged under the tower. In the centre of the floor is a brass plate marking the supposed site of the grave of Prince Edward of Wales, killed in 1471. The backs of the stalls, which are twenty-four in number, twelve on each side, are ancient, of Late Decorated date.

Set between the columns of the presbytery is a fine series of chantries. In the western bay, on the north side, is the well-known "Warwick" chantry, erected by Countess Isabel Despencer in memory of her first husband, Richard Beauchamp, killed in France, 1421. It is of elaborate Late Perpendicular work, full of delicate detail, the western portion divided into two storeys, the lower one supported on slender shafts carrying an elaborate fan-vault. Between the sills and plinths are angels holding shields, now defaced.

In the next bay is the "Founders' Chapel," so called from the remains of Robert Fitzhamon having been interred here, and the shrine built over them by Abbot Parker, in 1397. Before this the body lay buried in the Chapter House.

Next in order is the tomb of Sir Hugh Despencer and his wife, Elizabeth Montacute, who afterwards married Sir Guy de Bryan. His monument stands opposite, at the entrance to the Chapel of St. Margaret. Both these monuments have elaborate canopies.

On the south side the western bay is occupied by a screen. In the next bay is the Chapel of the Holy Trinity, erected to the memory of Sir Edward Despencer, K.G., by his wife, Lady Elizabeth. A curious kneeling effigy of the deceased surmounts the chantry.

The ambulatory is interesting from the fact

that a good deal of the Norman walling has been left. Two responds remain on the north and one on the south. Between it and the Chapel of St. James is a portion of one of the stone Decorated screens, already alluded to, with delicate tracery in low relief, and the arms of the Despencer introduced, and the upper part of open reticulated tracery. Another screen of the same date separates the ambulatory from St. Margaret's Chapel, and the curious monument (later in date, however), of Abbot Wakeman, with its cadaver, was once undoubtedly furnished with a screen also. In the chapel between that of St. Faith and the vestry is the monument of Abbot Cheltenham, much mutilated. West of this is a fine Decorated tomb\* without inscription, however. Further west are two earlier monuments, that of Abbot Allan being of the thirteenth century.

There are two recessed tombs behind the sedilia, one of which is attributed to Abbot John Cotes.

The vaulting of the whole of this part of the church is particularly beautiful, and the carved bosses are rich in figure-subjects. A large number of recesses remain in the walls of the chapels. One or two are obviously piscine, others are aumbreys. They are shown on the plan.

The destroyed Lady Chapel communicated with the church by a fine moulded arch. This, however, has been blocked up, and a modern window pierces the wall.

Throughout the building is a good deal of colour decoration. A diaper pattern appears at the back of the sedilia, several of the monuments retain their colouring to a large extent, and there are traces of fresco on the west face of the nave columns at the rood-screen. Besides this is the beautiful fourteenth-century glass still remaining in the clearstory windows of the presbytery.

A little distance west of the church is the "Abbey House," now part of the rectory, an elegant fragment of Perpendicular work.

Still further west is the gatehouse, also of Perpendicular date.

One of the most striking views of the church is from the private garden on the east side. An illustration of this was given in the *Builder* of January 29, 1887.

#### REREDOS, ST. NICHOLAS, BLUNDELL-SANDS.

The triptych illustrated was given by Sir William Forwood in memory of his daughter.

It was designed to form part of a composition in connexion with three large windows of the apse, two of which have been executed by Messrs. Powell, of Whitefriars.

The work was carried out (in oak) by Messrs. Norbury & Paterson, of Liverpool, from the design of the architect, Mr. W. D. Caroe.

#### PULPIT, ST. PAUL'S CHURCH, GREAT PORTLAND STREET.

This pulpit was completed and dedicated in 1892, the cost of the work being defrayed by members of the congregation. It is of hexagonal form, and one side being occupied by the entrance, there remain five solid sides, each of which displays between the pilasters an intarsia panel with a cartouche bearing one of the five sacred names, the initials of which make the word IHSYS. This symbolism is further borne out by the dolphins, which form part of the intarsia decoration. The work generally is of oak fumigated and brought to a dull polish; the inlaid panels are of walnut and box, with a slip of ebony in the frame.

The design is by Mr. Paul Waterhouse, A.R.I.B.A. (A. Waterhouse & Son), and the whole of the construction was carried out by Messrs. Shuffrey & Co., of Welbeck-street.

#### WINDOW, OLDBURY CHURCH, SALOP.

The illustration is from the design exhibited in the last Royal Academy. The window is one of a series which fills the church. The treatment is exceedingly light, the whole subject being almost entirely composed of various tints of white glass, with here and there a spot of colour, giving an effect of peculiar delicacy. The work has been designed and executed by Mr. Alfred O. Hemming, of London.

#### DESIGN FOR STAINED GLASS.

The design for stained glass of which we give an illustration this week is by Mr. P. H. Newman,

\* See *Builder*, December 18, 1886.



and was his only contribution to the Royal Academy Exhibition this year. Conceived in a Late Medieval spirit, it is treated in *grisaille*, enriched with golden tones, colour being sparingly introduced into a simple border. The figures of Adam and Eve relieve in delicate flesh tints and stain from the cold grey of the Tree of Knowledge, in which they, with the serpent, appear to be enmeshed. The surrounding tabernacle work, with the weeping angels, is of a warmer tone of white, a gradation to the fuller colour of the border.

The design was intended for a library window, the legend of the Tree of Knowledge (with the tree springing from a human head) constituting, we presume, a kind of symbolical warning against the abuse of book-learning.

#### ASSOCIATION OF MUNICIPAL ENGINEERS AT MIDDLESBROUGH.

The Association of Municipal and County Engineers held a Northern Counties district meeting at Middlesbrough on the 22nd ult. Mr. A. M. Fowler, C.E., of Manchester, presided, and there was a large attendance of North Country members.

The sad death of Mr. E. D. Latham, Borough Surveyor of Middlesbrough, on the eve of the meeting, exercised a depressing influence upon the proceedings, but the whole of the arrangements having been completed, and the members arriving in Middlesbrough before the news was generally known, made it impossible to postpone the meeting to a more opportune occasion.

The President having taken the chair, expressed deep regret at the deplorable circumstances under which they had met together. He moved "that the Association wish to convey their deepest sympathy to Mrs. Latham and family in their great bereavement in the loss of Mr. E. D. Latham, Borough Engineer of Middlesbrough, who was a Member of this Association."

Mr. T. W. Stainthorpe, Eston, who seconded, remarked that Mr. Latham was an eminent man in his profession, and belonged to an eminent engineering family.

The vote of condolence was adopted with unanimity.

On the motion of Mr. Thorold, of North Ormsdon, Mr. Howcroft, of Redcar, was unanimously re-elected Hon. Secretary for the Northern Counties district.

Mr. T. W. Stainthorpe, Surveyor to the Eston Local Board, read a paper descriptive of the floating hospital belonging to the Tees Port Sanitary Authority. He said the Authority was constituted by the Local Government Board in January, 1886, and consisted of 17 members selected from the following Riparian Authorities, viz.:—Middlesbrough, 7; Stockton, 3; Eston, 2; Thornaby, 2; Stockton (Rural), 2; and Normanby, 1. The special function of the Authority is to inspect every ship which comes into the Tees, and to see that all sanitary defects are promptly remedied, as well as to deal with all cases of infectious disease which may be found among the crews. The number of seamen entering the river is 60,000 a year. From the time the authority was constituted until the autumn of 1892 the only provision they possessed was the bulk of an old brig, with six beds, moored in the river near Newport; and since then eight cottages at Seaton Snook had been used as a temporary hospital. Upon the advice of Dr. Malcolmson the Port Sanitary Authority decided to provide a suitable hospital for the River Tees, and Mr. W. G. Laws, City Engineer of Newcastle-on-Tyne, was called in as Engineer. Mr. Laws advised the erection of a floating hospital, moored on the north side of the river, about half-a-mile below Eston Jetty, and the recommendation was accepted by the Authority, and the contract given to Messrs. Head, Wrightson & Co., of Thornaby-on-Tees. The berth was dredged from the sides, and a crescent-shaped breakwater constructed of slag to protect the hospital from the fierce gales which occasionally blow from the north and north-east. The float, on which the hospital buildings have been erected, consists of ten cylinders 86 ft. 6 in. long by 6 ft. in diameter. The plates are of 3 in. wrought iron of the best ship quality, jointed and single rivetted, with 3-in. rivets, 23-in. pitch and caulked, so as to be perfectly watertight. No. 9 rolled steel girders, each 140½ ft. long by 12 in. deep, connect the cylinders being fixed on curved saddles which rest upon and are rivetted thereto. The cylinders are fixed 14 ft. 6 in. from centre to centre. To ensure perfect rigidity of the float three large

beams are fixed at right-angles to and under the cylinders, for the full length of the float. Access to each cylinder is obtained by means of two watertight manhole covers. The height of the deck above the water-level is 4 ft., and a sloping gangway leads to a broad landing which is level with the deck of the steam-launch belonging to the Authority, so that easy access is secured between the launch and the deck. The moorings consist of wrought-iron cables fixed to heavy piles driven into the bed of the river. The buildings erected upon the float consist of two ward blocks and a large administrative midway between them. Immediately behind the administrative block are the laundry, mortuary, and destructor. The ward-blocks are each 68 ft. long and 24 ft. wide. No. 1 block consists of one small and one large ward. The former contains two beds, and will be used as the receiving or isolation ward, where patients will be kept until their cases are properly diagnosed. The large ward contains eight beds. Between the wards are placed the nurses' room and the bath-room. No. 2 block consists of a small ward containing four beds, and a larger ward containing six beds, with similar accommodation for nurses, &c. The Administrative block, 58 ft. by 30 ft., consists of matron's room (which will also be used as the dining-room), kitchen, scullery, larder, stores, medical officers' room, and four double-bedded rooms for the matron, day and night nurses, and servants. The laundry has been fitted by Messrs. Bradford & Co., of Salford; and the destructor for destroying infected bedding, clothes, and refuse has been supplied by Messrs. Goddard, Massey, & Warner, of Nottingham. The whole of the interior walls in the ward blocks are lined with ½-in. V-jointed pitch-pine boards, and the Administrative block with V-jointed Redwood boards. The whole of the windows are provided with shutters—a provision insisted upon by the Tees Conservancy Commissioners on account of the lighting and navigation of the river. The heating of the wards is by means of Musgrave's Ulster stoves, and the temperature can be easily regulated. Special precautions have been taken to prevent fire from the flue-pipes passing through the ceilings and roofs by means of light steel and cast-iron saddles. The fresh water supply is obtained from a 300 gallon cistern fixed in the roof of each block. It is proposed to convey the fresh water down the river in a proper water-boat, and pump it therefrom into the cisterns. Great care has been taken to secure thorough ventilation in the wards. This is secured by means of double-hung sashes, the upper portion of the window being fitted with a swing-sash opening inwards. Immediately under the head of each bed, and level with the floor, is fixed one of Kite's fresh air inlet ventilators. The ventilated air is removed by ventilating shafts carried through the roof. The total cubical area in the wards is 38,246 ft., and the superficial area 2,574 ft. This gives an average of 1,912 cubical feet, and 128 superficial feet per patient, which is slightly less than the Local Government Board's requirements for fever hospitals built on land. The total cost of the hospital has been 10,000*l.*, of which 3,000*l.* is cost of dredging for berth and 7,000*l.* erection of float and buildings. Mr. Stainthorpe acted jointly with Mr. Laws as Engineer to the Authority, and also as resident engineer during the construction of the hospital.

The members were entertained to luncheon at the Wellington Hotel by Mr. Laws, and subsequently proceeded on board the steam-launch *Oisprey* to the Floating Hospital, which was inspected, and the various details explained by Mr. Laws and Mr. Stainthorpe, the joint engineers. Upon the conclusion of the inspection the paper was discussed in the large ward of No. 1 block.

Dr. Malcolmson, Medical Officer of Health, Middlesbrough, said he believed the whole Tees district was indebted to Mr. Laws and Mr. Stainthorpe for providing one of the best hospitals in the Kingdom. In fact, he did not believe there was another port hospital like that in the world. The hospital had cost a great deal of money, but it was well expended if it secured them against the importation of disease.

The President congratulated Mr. Laws and Mr. Stainthorpe upon the very admirable structure they had erected.

Mr. Brown, West Hartlepool, criticised various details in the construction, more particularly as to the ventilation of the wards immediately under the beds of the patients.

Mr. Laws explained that in the ventilation of the wards they had tried to meet the wishes of the medical officer; and Mr. Stainthorpe said

that the ventilation was originally designed on the lines suggested by Mr. Brown, but the Local Government Board objected to that method.

After a question by the Rev. J. J. Nolan, Grangetown, as to the disposal of the dead, which the President ruled as outside the limits of discussion, a hearty vote of thanks was accorded to Mr. Stainthorpe for his paper, and was suitably acknowledged by that gentleman.

Prior to leaving the Council Chamber the members discussed the important paper by Mr. Laws, of Newcastle-on-Tyne, on the methods adopted for sterilising cholera dejecta, read at the last Annual Meeting of the Association in London.

The President expressed satisfaction at the great advance made in sanitation, as evidenced by the scientific arrangements made at Newcastle to prevent the spread of cholera.

Mr. Spencer, Tynemouth, said the greatest problem they had to solve with respect to infectious disease was the provision of something simple, inexpensive, and temporary in its nature, to meet recurring epidemics. Mr. Laws' paper was important because it described a method simple, convenient, cheap, and easily handled.

Mr. Laws, Newcastle-on-Tyne, said the cost of a sterilising pot, charged ready for action, was 30*l.* The time of closing the lid, turning on the steam, and ejecting the sterilised sewage was not more than five minutes, and the pot was left quite clean for the next charge.

A vote of thanks was accorded to Mr. Laws for his paper.

#### THE LONDON COUNTY COUNCIL.

A SPECIAL meeting of the London County Council was held at the County Hall, Spring Gardens, on the 23rd ult., Sir John Hutton, Chairman, presiding.

*The Council as Contractors.*—A long report was submitted by the Works Committee, giving further accounts for works as audited by the comptroller. In all there were thirty-two works mentioned, seventeen of which have already been reported on. The estimated cost of the seventeen works was stated to be 27,286*l.* 14*s.* 10*d.*, and the actual cost 24,965*l.* 13*s.* 11*d.* The estimated cost of the whole of the works was stated to be 66,061*l.* 19*s.* 2*d.*, and the actual cost 63,045*l.* 18*s.* 5*d.* In a few cases the figures had not been completely examined by the comptroller, but he had reported that they were not likely to be materially altered. The most important work was that of the New Cross Fire Brigade Station, where the estimated cost was 15,801*l.* 16*s.* 7*d.*, and the actual cost 18,785*l.* 8*s.* 8*d.* On the other hand, the cost of the Hackney to Holloway main relief sewer was put at 8,050*l.* 14*s.* 8*d.*, against an estimated cost of 12,672*l.* 12*s.* 5*d.* The report stated that the works in which the actual cost was below the estimated cost required but little comment. Where the quality of the work did not enter into consideration, or when it could not vary much, such as the excavation, brickwork, &c., in a sewer, the cost of the work contracted most favourably with the cost of that undertaken by a contractor. On the other hand, in architectural work, where the cost had exceeded the estimate, the Committee claimed for their work a quality which was only comparable with that executed by builders of the highest class, who rarely, if ever, undertook work at competitive prices. Their manager stated that in his estimates he assumed the work required would be of the ordinary quality, whereas the highest class had been demanded from him. As they had no stock of seasoned timber they had to purchase at a high price. For some time until they could erect machinery their joinery was made by hand. A number of foremen were engaged with high-class testimonials; a few of them had been unsatisfactory, and though they had been discharged they had naturally suffered through having no tried staff with which to commence. A number of instances had arisen where a contractor no doubt would have made large extra claims; but, of course, no such question could arise between committees of the Council. At New Cross Fire Brigade Station they were delayed nearly three months waiting for drawings of the ironwork, with the result that part of the brickwork was carried up piecemeal, and the rest had to be executed in the winter instead of in the summer. Their manager estimated that a loss of over 500*l.* had occurred that way.

Mr. Westcott moved as an amendment that the report be not received.



Mr. Remnant seconded the amendment. Mr. Thornton opened the debate, and in the course of his remarks he admitted that the Committee had not done all they expected, but they had had to contend against enormous difficulties, and, all things considered, the Committee had done very well.

Lieutenant-Colonel Ford denied that there was any desire on the part of the Moderate Party to smash the Works Committee, as had been alleged, but they did desire information. He thought that the date should be given when a work was commenced and when it was finished, for that was a material point.

Mr. Lloyd, who defended the Committee, said he thought that a sum, say 100,000, should be put to the credit of the Committee, and that they should be allowed to work on it.

Mr. John Burns, M.P., in the course of a long defence of the Committee, said the estimated cost of the work was 66,142*l.*, and the actual cost 63,045*l.*, a saving of 3,000*l.* and yet at the end of the year the policy of the Committee was said not to be a success, although there had been a saving of 4 per cent. all round under all the difficulties which had surrounded them. There had not been a single complaint of the work; if anything it was done too well. Their men refused to "scamp" work. He admitted that the Works Committee would never be able to make much profit, and if the architect subjected it to petty restrictions it would be a failure. They paid trade union wages, and the work was done better than it used to be. They were harassed by the demands of the architect's department ostensibly for information.

Mr. Becheroff rose to a point of order, and said if the architect was to be attacked he should think he should be present.

The Chairman said he did not recognise it as an attack.

Mr. Burns proceeded to deal with the report of the Parks and Open Spaces Committee.\* He said that the day of the middleman was over; and if they wanted good work they must have direct labour. That they had employed, and if there had been a loss of 4 per cent. on every job instead of a gain, it would be justifiable in the face of the high wages they had paid and the good work done.

Mr. Becheroff said that those who represented the Works Committee felt extremely uncomfortable if anything in the way of criticism was levelled at them. Mr. Burns had stated that a contractor would be pleased to get a profit of 4 per cent., but he doubted that statement, for looking at the risks they ran he thought that 10 to 15 per cent. was more what they looked for. The Council expected the Works Committee to get a profit of 5 per cent. on the works, but from facts he had in his mind he feared the result would be different. As a member of the Housing Committee he could not say there had been a saving in the work done for that Committee. He thought if they could not do better they should give it up.

Messrs. Arthur Arnold, Cohen, M.P., Lemon, and H. Ward (chairman of the Committee), having spoken, the amendment was put and declared lost.

Mr. Lemon then moved that the following words be added to the recommendation:—"And also provide that in carrying out any work the Works Committee shall not be at liberty to exceed the estimated amount of the cost except after a vote of the Council taken upon a recommendation submitted by the Committee for which the work is being carried out approving the additional expenditure." He thought that if business was to proceed on safe lines an account should be kept of how they were going on. The present unsatisfactory way of doing business ought to be altered, and he asked them to carry his recommendation.

Mr. Campbell seconded the amendment. Mr. Ward said that if the mover and seconder were practical men they would not have moved the amendment. It was impossible to stop a work three-fourths finished and say how much it cost.

Colonel Rotton said that in the Fire Brigade Committee from April 1, 1891, to March 31, 1892, the estimate for small jobs was 2,751*l.*, and the actual amount paid was 2,672*l.* In that year the work was done by contractors. From April 1, 1892, to March 31, 1893, the estimated cost for small jobs was 6,262*l.*, and the actual amount paid 6,897*l.* In that year part was done by contractors and part by the Works Committee. From April 1, 1893, to March 31, 1894, the estimate for jobbing work was 6,172*l.*, and the actual

cost 9,758*l.* In that year the whole of the work was done by the Works Committee. If any member had any charge to make against the architect or other officers, they should have the courage to put them in plain language.

Mr. Antrobus opposed the amendment, as he thought it was not practicable.

The amendment was lost by a large majority. Mr. Westcott then moved that the following words be added:—"And also provide that each Committee, on whose recommendation any work shall be given to the Works Committee, shall, in the event of the estimate being exceeded, report the same to the Council, with particulars of the amount by which it has been exceeded, and the reason thereof, so that the Council may have the whole facts before them."

This was seconded by Mr. Fletcher, and lost.

Mr. Becheroff said that he had intended to move an amendment on the discussion of the Parks Committee Report, but as it applied to the Works Committee it would be as well to move it now. He would move:—"That in view of the facts stated in the Report of the Parks and Open Spaces Committee it is desirable a profit and loss account on works executed by the Works Committee should be forthwith established by the Council, fed when occasion requires out of the Consolidated Fund, and that it be referred to the Finance Committee to consider and report as to the establishment of such an account."

Mr. Farrell, in seconding the amendment, said he could see no valid objection to it.

After further discussion the amendment was lost, and the recommendation of the Committee was agreed to.

The adjourned Report of the Parks and Open Spaces Committee regarding the excessive cost of works undertaken by the Works Committee was brought up. It was given *in extenso* in our issue of the 17th ult. The recommendation of the Committee was agreed to.

**York Water-gate.**—The Parks Committee reported:—

"The Council will remember that under the London Open Spaces Act, 1893, the York Water-gate and the strip of land bounding the Victoria Embankment Gardens to the north of the gate were transferred to the Council. We have carefully considered the question of dealing with this piece of land and the gate itself, having due regard to the desirableness of retaining so far as possible the gate in its present position, and at the same time making the interesting structure not altogether purposeless. The scheme which we now recommend to the Council for adoption provides for new entrances being formed to the gardens from Buckingham-street and York Building, the entrance in the latter case being through the water-gate. To enable this to be done with the gate at its present level, steps would have to be made leading to the gardens from the street. The approach to the gate from the gardens would be by two flights of stone steps meeting before the gate. This arrangement of stone steps and retaining walls will add considerably to the effect of the gate by breaking up the area of grass in the foreground. The strip of land now outside the gardens will be planted with trees and shrubs, so as to take off the bare appearance of the wall on the north side. A sum of 500*l.* is included in the estimates for the work, and the Finance Committee have arranged for the payment of the balance out of the contingency fund."

The Committee concluded their report with a recommendation that they be authorised to expend 650*l.* dealing with the York Water-gate. The recommendation was agreed to without debate.

**Regulations under the London Building Act, 1894.**—The adjourned report of the Building Act Committee consisted of a number of regulations and standing orders having reference to applications for sanction or consent under the various Metropolitan Building and Management Acts which had been made over again with particular reference to the new Act.

Notice had been given by Mr. Goodman of the following amendment on recommendation (b), (Part IX.—Dangerous and Neglected Structures):—

"That the following be inserted after Clause 2:—'In the event of the District Surveyor finding that in his opinion the structure is not in a dangerous state, and if it appear to him that the complaint relates to a question of repair only, he is to state that fact in his certificate.'"

The amendment, however, was lost, after a brief discussion, and the report was adopted.

The usual weekly meeting of the Council was held on Tuesday.

**Appointment of a River Committee.**—On the recommendation of the General Purposes Committee, it was resolved that a standing committee

should be appointed to deal with all questions connected with the conservancy of the rivers Thames and Lea, and that it should consist of the six representatives of the Council on the Thames Conservancy Board, the representatives of the Council on the Lea Conservancy Board, and five other members.

**Tumulus at Parliament Hill.**—Amongst the subjects dealt with in the report of the Parks and Open Spaces Committee was that of the recent exploration of the barrow on Parliament Hill, popularly known as "Boadicea's Tomb." The conclusions which Mr. C. H. Read, F.S.A., of the British Museum, who superintended the opening of the tumulus, arrived at were:—(a) That it is without question an artificial mound, raised at a spot where there was originally a slight rise in the ground. (b) That a great quantity of additional material was added to it, chiefly on the northern and eastern sides, and probably within the last two centuries. (c) That the tumulus has not been opened before. (d) That it is very probably an ancient British burial-mound of the early bronze period, and, therefore, centuries before the Christian era. The burial was probably by inhumation, and the bones have entirely disappeared, a circumstance by no means uncommon. In this interpretation of the evidence his opinion is supported by that of Canon Greenwell, whose lengthened experience of these burials enables him to speak with an authority beyond question upon this point." It was agreed that a vote of thanks be accorded Mr. Read.

The Council adjourned at a quarter to eight.

## ARCHITECTURAL SOCIETIES.

**LEEDS ARCHITECTURAL SOCIETY.**—At the second ordinary meeting of the Leeds and Yorkshire Architectural Society, held on the 26th ult. at the Leeds Mechanics' Institute, a paper, by Sir George Chubb, on the "History and Development of Locks and Safes," was read by Mr. H. W. Chubb. The ornamentation of locks and keys, he remarked, had never been erratic. It had altered in exact accordance with the ornamentation of the periods of art. Whenever architecture, the parent of the constructive arts, had changed its character for better or worse, it had elevated or depressed the character of its subsidiary arts, and the little metal keys and locks took their share in the change. He proceeded to describe modern keys and locks, illustrating his remarks by a number of interesting diagrams and models. One point of interest in modern safes and strong-rooms had reference to the heat and fire-resisting materials used in their construction. Any such material must in itself be incombustible as well as a non-conductor. Nothing, however, was perfectly proof against fire or thieves, the degree of protection depending upon the sum of money expended. Of strong-rooms and safes the lecturer exhibited several models. The chair was occupied by Mr. C. T. Dodgshun, the President of the Society.

**CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING ASSOCIATION.**—A meeting of this Association was held on the 21st ult. in the Town Hall, Carlisle, when a lecture was delivered by Mr. F. J. Nickols, Chief Assistant in the City Surveyor's Office, on "The Housing of the Working Classes." Mr. Claude Lonsdale, the President, being in the chair. Mr. Nickols commenced by defining "working classes" for the purpose of his paper as that class in receipt of from 18*s.* to 24*s.* weekly, and by detailing the law on the subject, in this connexion referring to the important powers granted by the 1890 Act when adopted by an authority. He then gave short descriptions of the buildings erected in London, Liverpool, and Leeds, with details of cost and rental. He drew comparisons between the respective merits of back-to-back houses, barrack-dwellings, and self-contained houses, pointing out the various advantages and disadvantages incurred by the adoption of each class, and gave as a conclusion that the self-contained house, where possible, with through ventilation, was by far the best form. A discussion followed, some favouring the flat system with an outside staircase, and condemning the back-to-back houses on account of inefficient ventilation and structural inconveniences. It was pointed out that a comparison could scarcely be drawn between barrack-dwellings and back-to-back houses, and that in any case self-contained houses, where possible, are much to be preferred.

**GLASGOW INSTITUTE OF ARCHITECTS.**—At an ordinary meeting of the Council of this Institute, held on the 26th ult. within the chambers of the Secretary, Mr. C. J. MacLean, 115, St.

\* See the *Builder* for Nov. 17, page 356.







The following table, by W. Sowerby Wilson, R.M.S., shows the daily yield of water from roof with varying rainfall:—

AREA OF HOUSE, 10 FT. BY 20 FT., OR 200 SQ. YD.  
FILL.

Mean Rainfall.	Loss from Evaporation.	Reusable Capacity of Tank.	Mean Daily Yield of Water.	Mean Daily Yield of Water in Wettest Year.	Mean Daily Yield of Water in Driest Year.
Inches.	Per Cent.	Cubic Feet.	Gals.	Gallons.	Gallons.
20	25	100	4.1	6.7	3.2
25	20	135	5.7	7.5	4.9
30	20	145	6.6	9.1	4.5
35	20	151	7.9	11.0	5.0
40	15	165	9.7	13.1	7.1
45	15	179	10.9	14.2	8.6

For any other size of roof or amount of rainfall, the numbers will be proportional.  
The area of roof-surface for collecting water must be measured on the flat, and not on the slope, and is the same as the area of the ground covered by the roof (if the ground be level). The average collecting area of house-roofs is about 10 square feet per individual.

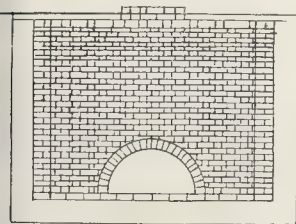
Roofs of houses in town, or near factories, or in any situation where the air is liable to pollution, are not suitable for collecting water for dietetic

purposes, and roofs covered with thatch, felt, lead, or zinc—the two last on account of the solvent property of rain-water—must not be used for the purpose. Lead pipes in connexion with the storage tank must also be avoided. In order to obtain a satisfactory supply of water for domestic purposes from roofs or similar areas, the greatest constant care is necessary to keep the roofs and gutters clean, and to remove all bird-excrement, &c.

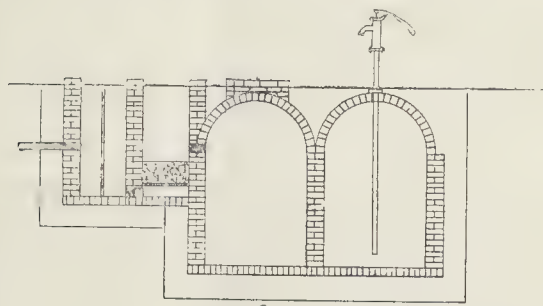
The first portion of the rainfall collected from roofs, especially after a long period of dry weather, is usually of an impure nature, on account of the soot and other matters which have had time to accumulate. In order to prevent this portion from entering the storage tank, mechanical appliances, known as "rain-water separators," have been devised. These consist of vessels into which the rainfall is directed before passing into the storage tank, and which are so constructed as to collect the first portion of the flow, and when full to cant over, emptying their contents to waste, and at the same time placing the flow of water from the roof in direct communication with the storage tank. When the flow has ceased they return automatically to their original position.

The rain-water may be stored in overground or underground cisterns, or reservoirs. The former have the advantage of enabling the water to be drawn direct by means of a tap, but are generally more expensive, and the water is subject to changes of temperature. The underground reservoir necessitates pumping, and is more liable to permit of pollution. The water should be strained through a copper strainer to keep back leaves, &c., and should be filtered before admission into the storage-tank. The filtering material may be sand, polarite, or other suitable substance. The tank should be efficiently ventilated; have a sufficient covering of earth so that the water may be kept at an equable temperature; and should be, if possible, provided with a wash-out valve for cleansing purposes. Fig. 55 is an illustration of a brick underground tank, with strainer and filter-bed, to contain 2,500 gals., designed for a small isolation hospital.

Where the roof surface is insufficient, a small area of ground may be fenced off, and either underdrained by means of agricultural tiles, or the surface may be covered with tiles or concrete, and the rain-water falling upon it taken by means of pipes to a storage-tank.



Section AB



Section CD

A

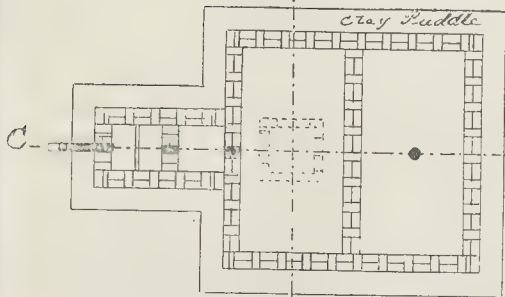


Fig 55

B

# GENERAL BUILDING NEWS.

FREE CHURCH, MORNINGSID, EDINBURGH.—A new church has just been erected at Morningside, Edinburgh, from plans prepared by Mr. Hippolyte Blanc, A.R.S.A., Edinburgh. The building is situated near the Churchhill corner of Morningside-road. As specially desired by the congregation, the building is designed in a phase of the Renaissance period, with campanile tower at the south-west corner, the building of the upper stages of which it is intended to leave meanwhile in abeyance. The plan of the church is an elongated rectangle, and it comprises the church area with recessed pulpit platform and organ chamber at one end, with vestibule and staircases at the others. Behind the church is a large hall accommodating 250 persons, class-room for sixty infants, vestry, session-room, and soiree kitchen; in an upper floor there is an additional class-room and a caretaker's residence. Towards the street the main building presents a composition of two stages, the lower pierced for three doorways grouped within two massive piers of channelled ashlar work. The entrance vestibule, which is paved with ceramic tiling in geometric design, measures about 30 ft. by 20 ft.; and at either end of it are the main stairways leading to the galleries. To keep the interior as light and airy as possible, instead of heavily projected galleries, those along each side have been projected to an extent to accommodate only a single row of sitters. They are supported upon cantilevers without any pillars, and their shallowness obviates the necessity for windows being placed under them. The back gallery is of normal depth, being extended over the entrance vestibule below. A passage of communication runs behind the sitters in the side galleries, and throughout the church there is an uninterrupted view of the pulpit secured by a single sifter. Both for the area and gallery floor, heating radiators are placed in wall recesses at regular intervals. The total accommodation of the church is upwards of 800. The material used for mason work is red Corsehill stone, for the constructive woodwork red pine, and for the finishings yellow pine. The estimates came to about 9,600.

COTTAGE HOMES FOR PAUPER CHILDREN, SHEFFIELD.—On the 24th ult., Sir Walter Foster, M.P., opened at Sheffield the new headquarters and receiving house, built in connexion with the system of isolated cottage homes which have been established throughout the city. The new buildings are situated on the Goddard Hall estate, in Smillern-lane, Crabtree. The gates opened by Sir Walter Foster adjoin the lodge of the administrative block and receiving home, in which are a waiting-room for applicants and parents visiting, medical officers' and examination-rooms, with bath, sitting-rooms for the foster-parents, a kitchen, separate day-rooms for boys and girls, lavatories, baths, and store-rooms. There are separate staircases and dormitories for boys and girls, with a bedroom for the foster-parents. Iron escape-stairs are placed outside of each dormitory, while across a yard from the girls' side are placed clothes store, washhouse, laundry, and disinfecting house, with independent entrance. From the lodge corridor run stores, and on the upper floor is an office for the superintendent and a committee-room. In the same building, and over the principal stores, is the residence for the superintendent. The three detached homes which at present complete the headquarters, and which have been respectively named "Ivy Cottage," "Hawthorne Cottage," and "Rose Cottage," are to the west of the entrance, each having a piece of garden, a playground, a shed, and a washhouse. The children's hospital is on the same estate, but approached in a northerly direction from the road between the three cottages and the administrative block. This building is intended ultimately to be connected by a corridor with the administrative block of the general hospital, which will be between it and the workhouse. Mr. C. J. Innocent, Sheffield, has been the architect; Messrs. George Longden & Son, Neepsend, the contractors; and Mr. George Malpas the clerk of works.

REBUILDING OF BANK, LIVERPOOL.—Messrs. Grayson & Ould, of Liverpool, have prepared designs for the rebuilding of the head office of the Bank of Liverpool. The fireproof floors and constructional iron and steel work will be put up by Messrs. Mark Fawcett & Co., of Westminster.

HALL AND SUNDAY-SCHOOLS, WYCLIFFE CHAPEL, SHEFFIELD.—On the 26th ult. the new hall and Sunday-schools which have been erected by the church worshipping at Wycliffe Chapel, Langsett-road, Sheffield, were opened. The site of the new buildings is in Channing-street. The block comprises a lecture-hall, with galleries on three sides, and with three separate approaches from the outside. There are also a room for week evening services, a ladies' vestry, deacons' and minister's vestries, choir vestry, infants' class-room, two rooms to be used in connexion with the young people's institute or club, kitchen, an elevator to the large hall, and all the usual conveniences. In addition to these rooms there are several other class-rooms, and store-rooms and cellars. The corridors and staircases are lined with glazed bricks, and are ornamented, the whole being connected with the chapel by a long passage. The building is of brick, with Grenoside stone dressings. The contract for the



whole of the works was taken by Mr. Joel Midwood, Walkley, Sheffield. The architect is Mr. C. J. Innocent, Sheffield.

**CATHOLIC CHURCH, MILES PLATING, LANCASTERS.**—The foundation stone of St. Edmund's Catholic Church, Miles Plating, was laid on the 24th ult. by the Rev. Dr. Bilsborrow, Bishop of Salford. The architects for the new buildings are Messrs. Fugin, of London, and the contractors Messrs. Robert Neill & Sons. The total cost is estimated at about 10,000*l.* The new church will provide accommodation for 1,100 persons. It will be divided into five bays, each 25 ft. long. In the bay at the west end the gallery will be placed, and another bay will be occupied by the chancel and side chapels. At the corner of Monsall-street and Mary-street a tower will ultimately be erected. The total length of the church internally will be 125 ft., the width 65 ft., and the apex of the roof will be 62 ft. above the level of the ground. The new church will be dedicated to St. Edmund, Archbishop of Canterbury in the thirteenth century.

**RENOVATION OF HYDRA CHURCH, NORFOLK.**—The Church of St. Peter and St. Paul, Heydon, has just been opened after partial restoration. The nave roof has been restored, and as much of the old timber as possible utilised in the interior work. The lead has been re-cast, and the parapets and copings repaired. Considerable attention has been paid to the renovation of the clearstory windows, which have been re-glazed, and partial restoration has been effected in the south aisle. The sacarium is paved with encaustic tiles, decorated with the emblems of St. Peter and St. Paul, and the ancient pulpit has undergone complete renovation. The entire work was carried out under the direction of Mr. Herbert J. Green, architect, of Norwich, the general work was done by Mr. Blyth, builder, of Foulsham, and the lead-casting, re-laying, and glazing by Mr. Gibson, plumber, of Norwich.

**NEW PREMISES FOR THE "HEXHAM COURANT."**—New premises for the *Hexham Courant* have just been erected at Hexham. The new buildings have a frontage of 33 ft. to Beaumont-street, and cover an area of 3,300 sq. ft. The offices are situated on the ground-floor. Immediately on the right of the entrance the public office is placed. Opening out of this is the office for the manager communicating with the public space. A large strong-room is arranged to the rear for the storage of books, paper, &c. A postal despatch-room adjoins this, communicating with the offices for the folding and despatching of newspapers. The printing department occupies a large portion of the site to the rear, and covers an area of 1,675 sq. ft. The whole is covered by an open roof with top light. A covered washing-yard for washing the type and damping the paper is situated behind the printing-room, adjoining which are placed the sanitary arrangements for the use of the staff, while below the washing-yard is placed the heating-chamber, containing boiler and fuel store. A paper store is situated on the first floor to the rear. A staircase connects this store with the printing department. Over the offices at the front is arranged the compositors' room, area 780 sq. ft. On the second, or top floor, over the above room, the whole of the editorial staff has been provided with rooms. Each floor is connected with a small lift, and speaking-tubes are fixed between each department and the manager's office. The whole establishment has been warmed by means of hot water on the low-pressure circulating system. The front elevation is a Renaissance treatment. The whole of the works have been carried out from the designs and under the personal supervision of the architects, Messrs. Marshall & Dick, of Newcastle. Mr. Edward Snowball, of Hexham, obtained the whole contract.

**NEW INFIRMARY, MERTHYR-TYDFIL.**—The Guardians for this Union have determined on the erection of an infirmary, at a cost of 10,000*l.* Mr. E. A. Johnson, of Abergavenny, will be the architect for the new building.

#### SANITARY AND ENGINEERING NEWS.

**SEWERAGE WORKS, SHIREHAMPTON, NEAR BRISTOL.**—Colonel Luard held an inquiry at Shirehampton on the 21st ult., with respect to an application to borrow money for the purpose of sewerage for a portion of Lower Shirehampton. Mr. A. P. I. Cotterell, C.E., of Bristol, attended and explained his scheme.

**RIVERS POLLUTION ACTS.**—An inquiry was held at Yatton, by Mr. W. J. B. Clerk, Inspector to the Local Government Board, on the 22nd ult., with respect to an application of the Bedminster Rural Sanitary Authority for permission to take proceedings against Messrs. S. F. Cox & Son, tanners, for pollution of a stream at Claverham, near Yatton. Mr. O'Donoghue represented the Authority, and produced witnesses in support of the application, which was opposed by Mr. J. Nichols (Benson, Carpenter & Co.), who claimed that the stream in question was already a sewer, and that Messrs. Cox & Son had been throughout desirous of meeting every reasonable wish of the Authority. Mr. A. P. I. Cotterell, C.E., of Bristol, attended on behalf of Messrs. Cox

& Son, and produced plans prepared by him for dealing with the tannery effluent.

**WATER SUPPLY WORKS, FULTON, NEAR BRISTOL.**—The Local Government Board have granted the application of the Authority for a loan for the purposes of carrying out works of water supply without an inquiry. Mr. A. P. I. Cotterell, of Bristol, is engineer to the works.

#### FOREIGN AND COLONIAL.

**FRANCE.**—The following architects have been appointed experts in connexion with the civil tribunal of the Seine:—MM. Auburtin, Laloux, Charles Lucas, Monduit, Roussi, Poulin, Roux, and Thomas. —M. René Dupont, who holds a Government diploma, has been appointed architect to the Colonial Ministry. —M. Fournereau, who is well known by his works on the Monuments of Cambodia, has been appointed Inspector of Museums and of Instruction in Drawing. —M. Lucien Doucet, painter, has been appointed Professor of Drawing at the Ecole Polytechnique, in place of M. Eugène Guillaume. M. Marius Roy, the military painter, has been appointed Master of Drawing at the same institution. —M. Rogero has received the first premium in the first competition opened by the "Union Artistique du Nord." —The municipality of Coucarneau has decided on the erection of a hospital in that town. —A new railway station is to be built at Rouen, for the Rouen and Orléans line, at a cost of 7,000,000 francs. —The exhibition of decorative art at Nantes has just been opened under the presidency of M. Roger Marx, Inspector-General of Museums. —M. Paul Lebègue, sculptor (pupil of David d'Angers), has been commissioned to carry out the decoration of the "Carmel" at Meaux. The work, carried out in the style of the thirteenth and fourteenth centuries, will comprise some important groups and bas-reliefs, and also caryatides. —The old church of Bougival is at present in process of demolition, preparatory to its rebuilding on the same site. The ancient tower, which is classed as a "monument historique," has been saved, but only to be "restored" at a cost of 500,000 francs, left for the purpose by a generous but ill-advised donor. The church itself was in a dangerous condition, and could not be retained. —The new bridge at Argenteuil is to be opened shortly. It will form the second portion of the conduit for the Paris sewage to the plain of Achères. The syphon at Clichy, recently opened, formed the first. M. Berlier, the engineer, has received the decoration of the Legion of Honour.

**GERMANY.**—The Emperor, it is now announced, will open the New Imperial Houses of Parliament on the 5th. On the 7th a banquet will be given to Herr Wallo, the architect, by the United Berlin Art and Architectural Societies. —The applications for space at the 1896 Industrial Exhibition are so numerous that in the case of several sections additional space has had to be provided. The Municipality of Berlin has formally handed over the Treptow Park to the Works Committee; the well-known architects, Messrs. Bruno Schmitz, Griesebach, and Hoffner, have been entrusted with the preparation of the plans for the buildings. —Professor Schlichting, the well-known Professor of Waterway Construction at the Charlottenburg Technical College, has died in his sixtieth year after a long and severe illness. He was for many years President of the Society for the Improvement of German River and Canal Navigation. The Architekten-Verein held a special meeting on the 19th inst., in commemoration of Geheimer Baurath Schmieder, who died in June last. Geheimerath Sarrazin, who presided, sketched his career. He was born in Berlin, in 1823, and educated there. His first success was in 1850, when he carried off the first premium in the competition for the design for a Rhine Bridge, at Cologne. In 1853 he obtained an important appointment in the Railway Department, and was principally employed in superintending construction in the Rhine district. In 1866 he was appointed lecturer on bridge construction at the Berlin Architectural Academy, becoming in 1868 Geheimer Baurath, and as such responsible for the plans of all the great engineering works on the German railways since his retirement in 1891. Herr Sarrazin prosecuted to save the time in the period between 1870 and 1890 no large building work, bridge, viaduct, or span, was executed in Germany, the plans of which were not based on the results of Schwedler investigations. —Schools are to be erected in the Streitzstrasse and in the Glogauerstrasse at Berlin, at a cost of about 25,000*l.* each. —The Roman bridge at Heidelberg have been discovered whilst laying pipes below the new bridge in the Neuenheim quarter. —The Roman Castellum close to the railway-station at Weissenburg has been now completely opened up by Herr Kohl, of the "Limes" Commission. On either side of the Pretorium traces of buildings of considerable size were discovered, as well as remains of battlements. The fort formed a square, the sides being 170 metres long, or 560 ft.; there was a portal on each front flanked by towers. Towers at the four corners, as well as twelve others equally distant at the sides, completed the defensive works.

#### MISCELLANEOUS.

**ARCHITECTURAL ASSOCIATION—DISCUSSION SECTION.**—The second meeting of the Session was held at 56, Great Marlborough-street, on the 28th ult., when a paper on "Joinery" was read by Mr. E. Howley Sim, A.R.B.A. The chair was occupied by Mr. W. Henry White, and Mr. H. D. Searles-Wood attended as special Visitor. Messrs. Stockdale, Waymouth, and others joined in the discussion which followed the paper.

**TWO ITALIAN CANAL PROJECTS.**—According to Italian journals projects are on the tapis for the construction of two important canals in Italy. One framed by Signor Vittorio Bocca, engineer, advocates the construction of a canal between the Tyrrhenian and Adriatic Seas. It would be 200 kilometres in length, and run from Montalto di Castro, in the province of Rome, cut through the peninsula in a north-easterly direction, and strike the east coast at Fairo. The width of the canal is to be 80 metres and the depth 12 metres, rendering it navigable for the largest vessels afloat. At the same time the swamps and lakes at Bolsena, Chiusi, Montepulciano, with Lake Trausimano, are to be drained, whereby 950 square kilometres of arable land would be recovered. The cost of this scheme is estimated at about six hundred million lire. A smaller scheme is advanced by two engineers, Faggari and Morandini. They advocate the construction of a canal 37 kilometres in length, through the peninsula, Reggio, in the province of Cotrone. It is to run from the Bay of Santa Euphemia, on the Tyrrhenian Sea, along the bed of the river Amata, through the watershed of the two seas, and follow the bed of the river Caracae to the Bay of Squillace, on the Ionian Sea. This canal would obviate the detour for vessels around Sicily on the voyage through the Strait of Messina. The cost of the scheme would be covered by the recovery of 80,000 hectolitres of arable land along the beds of the rivers referred to.

**ELECTRIC LIGHTING, BOURNEMOUTH.**—The Lighting Committee of the Bournemouth Corporation have recommended the Town Council to accept the offer of the Bournemouth and District Electric Light Company to supply current to the Winter Gardens at a reduction in cost of 25 per cent. This was in consequence of a report by Mr. E. Matthew Lacey, Consulting Engineer, proposing a scheme for the Corporation to generate their own current, by which a saving of 150*l.* per annum was shown. Mr. Lacey also reported on the proposed scheme for lighting the pier and pleasure grounds.

**A SMOKE-CONSUMING GRATE.**—Our attention has recently been called to the kitchen-ranges, stoves, &c., of the Economic Smokeless Fire Company, Limited, of Shaftesbury-avenue. It is claimed for these "patent fires" that they practically consume their own smoke, and that the process is accompanied by the evolution of great heat; therefore, this should not only form an important addition to the apparatus at present devised for abating the smoke nuisance, but effect considerable economy in the matter of fuel. An opportunity was afforded us of examining the system in detail, and we are perfectly satisfied with the results. We noticed that the principle involved is not absolutely novel, though there is sufficient departure from other methods to enable us to regard the arrangement as a whole in the light of a new invention. The smoke generated by the fire is made to pass downwards (the fire being lighted from the top), it then ascends into a hot-air chamber situated at the back of the grate, the principle involved is not absolutely novel, though there is sufficient departure from other methods to enable us to regard the arrangement as a whole in the light of a new invention. The smoke generated by the fire is made to pass downwards (the fire being lighted from the top), it then ascends into a hot-air chamber situated at the back of the grate, the principle involved is not absolutely novel, though there is sufficient departure from other methods to enable us to regard the arrangement as a whole in the light of a new invention. 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**PARTNERSHIPS.**—Mr. Louis Jacob, of New Cross, and Mr. J. Arthur Brand, have entered into partnership as architects in Gresham-street, City, under the style of Jacob & Brand.—Mr. Coath Adams, architect, of London, has entered into partnership with Mr. J. H. Keats, of Plymouth, under the style of "Keats & Coath Adams."

**CEMETERY, KING'S NORTON.**—An inquiry was held at the Institute, King's Heath, on the 28th ult., before Mr. F. H. Tulloch, M.Inst.C.E., one of the Inspectors of the Local Government Board, as to an application by the King's Norton Rural Sanitary Authority to borrow the sum of 10,500*l.* for the purchase of land for the purposes of a cemetery, and the fencing and laying out of the same. Mr. Edwin Docker conducted the case on behalf of the Authority, and Mr. R. Goulfey, Surveyor, explained the scheme. There was opposition from one adjoining land-owner only. After the inquiry the Inspector visited the site, and expressed himself as well pleased with the dryness of the subsoil.

**THE CONFERENCE ON LIGHT RAILWAYS.** The Council of the Surveyors' Institution have nominated Mr. E. P. Squary (Past-President) and Mr. C. Oakley (vice-President) to represent them at the Conference on Light Railways to be held under the auspices of the Board of Trade on the 6th inst.

**ABERDEEN.**—**THE GRANITE TRADE.**—During the financial year ended 30th September, the books of the Harbour Board show that the imports of timber by sea reached 2,682,208 cubic feet, an increase of about 25 per cent. on the previous year. As all the new buildings in Aberdeen have granite walls, the granite-quarries in the district reaped the advantage of the exceptional demand by obtaining the highest prices. Though several master-masons complain of delay in the execution of orders for building-material. In the harbour financial year there were exported 22,106 tons of granite causeway stones (a rise of nearly 27 per cent. over 1892-3), 5,820 tons of granite kerb, pavement, and building stones; 11,258 tons of granite-chips and rubble, and 943 tons of granite-slab. Of granite slabs or of Adamantine, there were exported by sea 1,183 tons plain, and 28 tons enamelled or polished. "Adamantine" has also been used for covering the culverts in the electric light works in Aberdeen. In the ornamental and polished granite trade—in which about fifty yards are now exclusively employed—business during the year has been somewhat stiff, chiefly owing to the unsatisfactory state of matters in America, the scarcity of orders from which produced severe competition and low prices for the home trade. The total volume of the industry, however, has not been much under that of last year, though in some of the smaller works reductions in the number of hands and granite merchants generally report the prospects for the winter as dull. The tariff question in America was settled too late in the season to be of material advantage this year, as shipments mostly cease about October; but in the early spring a special facility to the trade in this direction is confidently expected. Other outlets for granite have not been found. A large amount of work, both for monumental and architectural purposes, has been sent to the Continent, France especially going in largely for polished red granite, while South Africa, Australia, Russia, and New Zealand has each contributed its quota of orders. The harbour books show that 1,600 tons of granite were imported by sea during the year, as against 13,700 for the preceding year. These stones come mainly from Sweden, and though all classed as "granite," they include specimens defective either in quartz or mica, being, in fact, porphyry, or what is known in Sweden as "porphyre." In other cases, again, lime takes the place of felspar, and the stones are called "marble" in Sweden, being really a kind of marble. Some architects at a distance insist, against the advice of the Aberdeen merchants, on getting green-coloured Swedish stones for polished fronts. The stones of this hue look beautiful when newly polished, but the brilliancy is evanescent, and fades fast on exposure, to the disappointment of the customers. The Americans have already abandoned their use for tombstones. The granite merchants in Aberdeen have not found any polished goods to last so well as the dark-grey or "blue" Rubislav and the pink or "red" Peterhead stones. Polished specimens of these Aberdeenshire granites exist which from their compact grain do not appear to be altered in the least when exposed to sixty years' exposure. There is, however, a fair demand for Scandinavian "Labradorite," which looks well when polished. For the year ended 30th September, the total amount of polished granite exported from Aberdeen harbour was 6,448 tons, against 5,915 for 1892-3. This does not include the output for America, which is taken by rail to Glasgow and shipped there, nor for inland places. Statistics as to these cannot be got from the railway companies; but the demand for polished granite for the United States alone, though it is now principally confined to "red" stones, is at least double the quantity exported from the docks at Aberdeen. Among special work on canal, bridge, and pier work, R. Simpson, North British Granite Works, has a good order for polished

columns for a building near London, and is constructing two large monuments, one for Port Elizabeth and the other for Tasmania. Messrs. McIntosh & Rae, Lorne Granite Works, have in hand a coat-of-arms for Crathes Castle, and a large monument for abroad is being made at Victoria Granite Works. Mr. J. Hutcheon, King-street Cemetery Granite Works, is getting ready the pedestals, parapets, and balustrades for a bridge over the Kelvin, in the West-End Park, Glasgow, all of dressed Hill of Iarc granite.

**SOCIETY OF ENGINEERS.**—The Council of this Society have unanimously elected Mr. S. Herbert Cox as one of the vice-presidents in the place of Mr. Henry Falja, deceased, and Messrs. Henry O'Connor and William Bradford as members of Council.

**THE SANITARY INSTITUTE.**—At the meeting on the 12th inst. of the Sanitary Institute, at 8 p.m., a discussion on "The Sanitary Aspects of the London Building Act," is to be opened by Dr. G. B. Longstaff, chairman of the Building Act Committee of the London County Council, when other members of the County Council, members of Local Boards and Vestries, and those officers who will be concerned in carrying out the provisions of the Act, are expected to take part in the discussion.

**BISHOPSGATE INSTITUTE.**—The Adams Building Trades Emporium ask us to mention that their bolts were selected for the exit doors at this building.

**CEMETERY, ALTRINCHAM.**—The new cemetery at Altrincham was opened and dedicated to the public on the 28th ult. by Alderman Griffin, J.P., Mayor of Altrincham. The work has been carried out at a cost of 9,000*l.* The chapel, of fourteenth-century Gothic style, is faced with Halifax stone, and provides sitting accommodation for seventy people, besides mortuary, vestry, &c. The works have been carried out from the designs and under the superintendence of Mr. Wm. Owen, architect, of Manchester. Mr. John Matthews, of Nantwich, was the principal contractor, and the other contractors were:—Heating, Mr. James Smith, Altrincham; mosaic floor, &c., Messrs. J. & H. Patteson, Manchester; stained glass, Mr. James Jones, Manchester; entrance gates, &c., Messrs. Cunliffe & Dean, Manchester; boundary-wall, Mr. J. H. Holt, Altrincham.

**BUILDERS' CLERKS' BENEVOLENT INSTITUTION.**—A special general meeting for the election of one pensioner and one orphan took place at the offices of the Builders' Clerks' Benevolent Institution, 21, New Bridge-street, E.C., on the 28th ult., the President, Mr. William Shepherd, occupying the chair. There were two candidates for the pension, viz. Mrs. S. A. Bennett and Mrs. S. Lovett; and two for the orphan vacancy, viz. Kate C. Hill, aged 9, and Helena M. Smith, aged 3. The poll commenced at 7 p.m., and soon after its close, at 8 o'clock, the result was made known as follows:—For Pension—Mrs. Bennett, 1,108 votes; and Mrs. S. Lovett, 537 votes. For Orphan Vacancy—Kate C. Hill, 880 votes; and Helena M. Smith, 494 votes. The Chairman then announced that the successful candidates were Mrs. S. A. Bennett, who would receive the widows' pension of 20*l.* per annum, and Kate C. Hill, who would be admitted in January next to the Orphan Working School, Maitland Park, per presentation of the Institution. The successful Messrs. Ernest S. Rider, T. Stirling, jun., and H. W. Parker, were then thanked for their services, followed by a vote of thanks to the President for his kind attendance and occupancy of the chair.

**THE LONDON COUNTY COUNCIL IN PARLIAMENT.**—**SESSION 1895.**—The Council will apply for leave to bring in Bills for the following purposes:—A new approach to Tower Bridge from the south, by a road to Tooley-street (opposite the bridge) from the junction of Old Kent-road and Bermondsey New-road. The proposed thoroughfare will consist of a widening of Bermondsey New-road along a portion of each side, a new road from Grange-road to Artillery-street, and a widening of Church-row, Horseleydown. It appropriates the sites of Procter-place and Bermondsey-square, which represent the Close of the Cluniac monastery, and is entered from Grange-road and Abbey-street through openings where stood the gates; the great north gate remained until 1807. For this project the Council will frame an Assessment or Provisional Award, describing the lands which in their opinion should bear and pay the improvement cost of 200,000*l.*, the law charges being 70,000*l.* in addition. Ralph Dodd's design for a stone bridge of nine arches with a span of 78 ft. was ultimately modified and James Walker adopted iron arches, to lower the expenses. A Bill for altering the system now in force with respect to the valuation and assessment of hereditaments and property, with the repeal of certain Acts *ad hoc* for acts they relate to London. It is proposed to set up Assessment Committees

for unions and parishes, to appoint a valuation court for hearing appeals against valuation lists, and to make new provisions for the valuation of railways, tramways, canals, docks, water, gas, and hydraulic power works, and of telegraph, telephone, and electricity works which extend into more parishes than one, special yearly valuations being made for the last-named. To work the tramways acquired by them. To purchase by agreement or arbitration the several undertakings of certain waterworks companies—namely, Lambeth, first established in 1785 at Belvidere; Southwark and Vauxhall; Kent (1809); East London (1853); Chelsea, founded in 1724; Grand Junction, projected in 1798, and since 1820 supplied from the Thames; West Middlesex, established in 1806; and the New River, whose earliest Acts of Parliament are of 13 Elizabeth and 3 and 4 James I. Their "general powers" Bill comprises the following projects: To widen the east side of Blackstock-road, Islington, between the two points opposite Myrtle-mews and Elwood-street, the Vestry contributing; to widen the south approach to Woolwich Ferry; to acquire Nos. 2-8 and 22-8 (even), Winchester-terrace, Causton-street, with Nos. 1-7 (odd), Vincent-street, for making approaches to the ground to be acquired by the Council for working-class dwellings on the Millbank Penitentiary site, between Ben Jonson-road, Mile End Old Town, on its north side, between High- and Ocean-streets, the Mile End Vestry and Limehouse Board of Works contributing; to acquire a plot and buildings adjoining St. Alphege, Greenwich, Recreation-ground, for a Coroner's Court, a Weights and Measures Office, and a Mortuary; also, on the north-west corner of Drummond-street, Hampstead-road, and four houses in Florence-street, Islington, for purposes of the Fire Brigade; to further provide as to boat-hire and the formation of gymnasiums in parks and open spaces under their control; to provide for contribution by the Plumstead Vestry to the purchase of lands as an addition to Bostall Heath, and similarly by the Greenwich Board of Works in respect of an open space in St. Paul's parish, Deptford, such moneys to be charged only on St. Paul's parish (which, by an independent Bill prepared for next Session, is to be separated from Greenwich district); by the Poplar Board of Works for an open space in the Isle of Dogs; by the Greenwich Vestry for the additional entrance into Brockwell Park; and by the Lee Board of Works in respect of an open space at Manor-lane, Lee. The Council seek to effect a re-arrangement of polling districts for their own elections, as well as for Parliamentary and County Council purposes; and an alteration of wards in parishes and districts, together with the several numbers of vestrymen representing the same; and to determine an unwieldy state of things now existing by granting a pension to the chairman of Court of Quarter Sessions for the County of London. They have resolved, further, to apply, as from the 15th inst., their code of by-laws, lately approved by the Home Secretary, to the parks, gardens, and open spaces, already seventy-four in number, vested in them and under their management.

**ANNUAL SOIREE OF EDINBURGH PLASTERERS.**—In the Oddfellows' Hall, Edinburgh, the annual soiree and concert under the auspices of the local branch of the Scottish National Operative Plasterers' Federal Union was held on the 16th ult. Councillor Johnston, who presided, said they formerly and the Plasterers' Society, a comparatively local society, and that seven or eight years ago the Federal Union was formed. It spoke volumes for the trade that now nearly if not all the journeymen plasterers in Scotland were members of that union. He believed that if ever working-men were to benefit themselves it must be by helping each other. He was glad to know that through an arbitration board there had been a congenial method of working for a considerable time, and that wages would probably be increased a halfpenny per hour at the beginning of 1895.

**GLASGOW SCHOOL OF ART.**—The third of the series of lectures on "Medieval Architecture" was delivered on the 21st ult., within the Corporation Galleries, by Mr. Alexander M'Gibbon, architect. The subject was principally the second period of English architecture, the work of the transition from Romanesque to Gothic, in this country from Norman to Early English. Although the term Transitional is generic, it is well understood as applying particularly to the style current with us during the second half of the twelfth century. It is the assimilation of Norman tastes and methods with the indigenous Saxon traditional practices, before the pointed Gothic was accepted from Royal France, and a complete break made with Romanesque usage. The pointed arch that in France was employed because of structural necessity, where vaulting was conceived of as essential, when imported to England was first used as much because of the novelty, or groined vaulting was not by us universally desired, so the semi-circular arch was equally favoured. This, with much of Norman ornament refined and elaborated, joined to the greater elegance and loftiness of arches and columns that is characteristic of the Early English style which succeeded constitutes the excellences of Transitional. In Scotland the finest examples are found at Jedburgh, Kelso, Dryburgh, and Kilwinning, Abbeys though











**GLASGOW:**  
47 and 49, ST. ENOCH-SQUARE.



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"One Ash," Loughboro.—Mr. Lamer Sugden, F.R.I.B.A., Architect .....	Double-Page Ink-Photo.
"A Country Retreat."—Mr. A. N. Prentice, A.R.I.B.A., Architect .....	Double-Page Photo-Litho.
House at Beckenham.—Mr. Allan F. Vigers, Architect .....	Single-Page Ink-Photo.
House, near St. Albans.—Mr. Allan F. Vigers, Architect .....	Single-Page Ink-Photo.

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### Commercialism in Art.



ONE of the most recent charges brought against modern Art, and one often urged by artists themselves, is that it is degraded by money considerations; that architects, painters, sculptors, and others, instead of being carried away by enthusiasm, and working at their "Art for Art's sake," are always thinking about the pay they are going to receive, and act upon the strictly trade principle of "so much work for so much money." This has been called "commercialism," and we are told that it is the ruin of all Art, and that it is this detestable principle which makes the Art of our day so inferior to that of the Middle Ages. Speaking at the Church Congress recently held at Exeter, Mr. W. B. Richmond, in a very able paper, to which we have already referred, lamenting the commercialism of modern Art, pointed out that evidences of its existence were shown in ecclesiastical structures and their appurtenances.

"Carvings were made to order and run out cheaply from those in stock. A commercially-turned-out reredos was erected to a well-known pattern, bearing a considerable resemblance to a twelfth-century. . . . The stained-glass window was a great fetish of the pious world, and there was a large trade for that commodity. It was of two kinds—the trade and the Art window—but granting that there were few notable exceptions, the one was pretty nearly as valueless as the other. Hundreds of both were turned out every year with machine-like precision and rapidity. In the place of robust design, full of meaning, and such manly work as the twelfth, thirteenth, fourteenth, fifteenth, and even sixteenth century artists made; we were asked now to accept mawkish sentiment. . . . "Weak and pretty saints, who would have flinched from the gridiron and become hysterical in the Roman amphitheatre. Even the sacred Central Figure of Christianity was too often misrepresented as a characterless, weak man, to whom no one would go for advice, much less worship."

"Let them go to Assisi, Santa Maria Novella, York, Tewkesbury, Rome, Verona,

Orvieto, Wells, Venice, Lincoln, Exeter, and try to persuade themselves that the work here was designed by architects and carried out by the trade, they would fail to be persuaded."

Now, of course, there is a good deal of truth in what Mr. Richmond says. We all know the kind of reredos he describes; the mechanical-looking stained-glass window, the mawkish, sentimental saints, and the undignified and feeble representations of the Saviour. We acknowledge that these things are bad in Art and wretched in sentiment, but where we are not quite prepared to follow Mr. Richmond is in the suggestions that these are the outcome of "commercialism" in "modern Art," and the consequent conclusion that commercialism did not exist in ancient art.

If Mr. Richmond and the other gentlemen who have so severely denounced the "commercialism" of modern Art would define exactly what they mean by this new word "commercialism" in such a connexion, we should be better able to grapple with the question. Are we, for instance, to take Mr. Morris seriously when he tells us, in "News from Nowhere," that an artist ought not to expect to be paid for high-class Art work, but ought to consider himself sufficiently paid by the pleasure he derives from a noble work, and should only look for payment when he is doing what is disagreeable or repulsive? Does Mr. Morris himself act on that principle?

Mr. Morris, it is true, is depicting a state of society which never has existed and which never could possibly exist under any conditions or circumstances known to human experience—so that it is possible he may be indulging in a joke at the expense of his readers. But if we are to take the passage seriously, it appears to us that it would defeat the whole idea and theory held by the gentlemen of this school; because it is evident that if a man is not to be paid for his Art when he takes a pleasure in it, and is to be paid for it when it is repulsive, that Art which gives pleasure to its producers can only be practised by the artist who is in independent circumstances, or the rich amateur. Whereas the poor man, who must make money by his Art in order that he may live, and support those dependent on him, must only produce such Art as is repulsive to him. In other words, the rich man is to have a life of most pleasant occupation, and the poor man one of hateful toil, and this perfectly irrespective of the fact

that the poor man may possess real genius, and the rich one be a mere pretender—an arrangement which, it seems to us, would render the world far worse than it is at present.

Nor can we see why a man should not be paid for good work because he takes a pleasure in it, for it is almost certain that the better a man's work the more pride or pleasure he will take in it—consequently, the purchaser obtains a far better article for his money, and if he gets that which is of higher value why should he not pay in proportion? Commercialism in some form or other must enter into all questions of Art. We see no reason whatever why ecclesiastical or religious Art should prove any exception to this rule, and we maintain that it never has done so from the earliest times. We believe that the universal principle of supply and demand, of so much work so much pay, although, at times, owing to human weakness, it may be abused and occasionally require readjusting, works better than any Utopian theory. And we maintain that Art, whether ecclesiastical or secular, has always been subject to this rule. If we want examples of this, take the account, given in the Scriptures, of the building of Solomon's Temple.

In the First Book of Kings, Chap. v., verse 6, Solomon, writing to Hiram, King of Tyre, addresses him as follows: "Now therefore command thou that they (Hiram's workmen) hew me trees out of Lebanon; and my servants shall be with thy servants, and unto thee will I give hire for thy servants according to all that thou shalt appoint." . . . And in verses 10 and 11: "So Hiram gave Solomon cedar trees and fir trees according to all his desire. And Solomon gave Hiram twenty thousand measures of wheat for food to his household, and twenty measures of pure oil: thus gave Solomon to Hiram year by year."

Again, in the Second Book of Chronicles, Chap. ii., verse 10:—

"And behold, I will give to thy servants, the hewers that cut timber, twenty thousand measures of beaten wheat, and twenty thousand measures of barley, and twenty thousand baths of wine, and twenty thousand baths of oil."

It may be advanced that these were "mere workmen," who, of course, must be subject to a commercial arrangement. But this was not altogether the case, because Hiram says, in verses 13, 14, and 15:—"And now I have sent a cunning man, endowed



with understanding, of Hiram my father's, the son of a woman of the daughters of Dan, and his father was a man of Tyre, skilful to work in gold, and in silver, in brass, in iron, in stone, and in timber, in purple, in blue, and in fine linen, and in crimson; also to grave any manner of graving, and to find out every device which shall be put to him, with thy cunning men, and with the cunning men of my lord David thy Father. Now therefore the wheat, and the barley, the oil, and the wine, which my lord hath spoken of, let him send unto his servants."

It is surely evident from this that distinctly commercial transactions took place.

In the Middle Ages we find the same commercial arrangements connected with Art. Mr. Richmond speaks of "commercially-turned-out reredoses." Well, they evidently had such things in the Middle Ages. We give sketches of two reredoses (fig. 1), one in the Church of Xanten, in Germany, and the other in St. Germain l'Auxerrois, at Paris. Now, if our readers will compare the carved portions of these two works, it will be noticed that they are identical, undoubtedly worked from the same design. The omission of a canopy between the upper subjects in the central compartment is a very peculiar arrangement, yet we find it in both. The peculiar treatment of the lowest canopy is also identical. We also find, at Bruges and Roermond, carved wooden reredoses of similar design, also at St. Denis and Herenthals—in fact, there is so decided a similarity between many of these Flemish reredoses that there can be no doubt they were all made in one "shop," kept in stock, and were simply "commercially-turned-out reredoses." We grant that these old reredoses are beautiful works, and that the modern reredoses described by Mr. Richmond is not beautiful, but we deny that commercialism has anything to do with the question. In old stained glass it is by no means uncommon to find the same cartoon used, reversed, to represent two different saints or angels.

In a cast-iron stove at Coburg (fig. 2), dated 1505, moulds have been re-used which were certainly not made for this stove, as the panels do not fit in or enter properly into the composition.

Then, again, we have frequent examples of "cheeseparing" in the Middle Ages. The nave of St. Alban's Abbey is a well-known example, where bases for shafts and small columns have been provided, but the columns, shafts, and mouldings have been omitted, as the work went on, in order to cheapen the building. One of the most interesting specimens, however, is in the beautiful north-west tower of the cathedral of Bamberg (fig. 3), which is so remarkable from the fact that it is certainly the finest example of pure first-pointed work in South Germany, and bears such a singular likeness to the towers of Laon Cathedral, that there must be some relationship between the two, though they are certainly not the work of the same architect, because, although slightly later in date, Bamberg retains more Romanesque feeling than Laon. (The Bamberg towers date, according to Kugler, from about 1274.) The way in which the economy was effected can be best understood from our sketch, where it will be noticed that a gorgeous arrangement of shafted arcading was proposed, but cheapened out of existence.

In the little cloister of Old St. Paul's the same economical changes were carried out. The ruins discovered by Mr. Penrose some years back show that an extremely elaborate design was started about the end of the fourteenth century, with most intricate sets of shafts and mouldings (fig. 4), but before the building had risen three feet out of the ground, economical ideas gained the day, and the shafts were omitted, the elaborate suits of mouldings left out, and Reigate stone substituted for Purbeck marble.

At one of the very cathedrals which Mr. Richmond mentions, and in which he says people would fail to be convinced that the

work was carried out by men working under an architect, there is in existence a kind of agreement with the "Magister Operum" or "Cementarius," in which he makes a condition that the coats supplied him as part of his pay shall not be of a material which we may describe by the modern word "shoddy." And Mr. Street, in his "Spain," gives numerous extracts from the chapter rôles of the noble cathedrals of that country, showing distinctly that they were erected under regular contracts or agreements between the ecclesiastical authorities and the architects. For instance, at Barcelona, the authorities determined to employ the services of an architect named Jayme Fabre. Jayme Fabre was at the time erecting the great church for the Dominicans at Palma, and he did not wish to give up this work, so a most carefully-worded document was drawn out stating not only the salary he was to be paid for his work at Barcelona (eighteen sueldos a week), but that his voyage to Barcelona and back were also to be defrayed by the Chapter, that a house was to be provided for him, and clothes for himself and children. There appears to have been a dispute about the number of hats provided. In fact, the whole affair was most distinctly a business transaction. Two architects from Narbonne were employed in the rebuilding of the Cathedral of Gerona, with the understanding that they were to receive 150 sueldos a-quarter, and to come from Narbonne to Gerona six times a-year. These agreements date from the commencement of the fourteenth century, 1317-1339, and refer to the two finest fourteenth-century churches in Spain, works which, for romantic, poetical, and religious feeling, are unsurpassed by any buildings in Europe.

There is also a document, quoted by Mr. Street, in which Rodrigo de Houtenon, the architect of the Cathedral of Segovia, agrees to build the tower and nave of a church at Valladolid, according to his plan, for a specified sum of money. Nor are these kind of transactions in any way peculiar to Spain. For we find at York William de Horton agreeing to receive 2s. 6d. per week, a premium of 10l. a-year, and a house for work he was carrying on at the cathedral; and he stipulates that he shall be allowed to undertake other works. At Exeter Master Roger received 12. 10s. per quarter, and at St. Stephen's Chapel, Westminster, the most complete accounts exist of the payment made, not only to the architect—Master Thomas of Canterbury—but to the masons whom he directed and to the painters who covered the walls of that exquisite chapel with pictures; and here we notice that the painters were not allowed a free hand to do what they liked, but that a certain Master Hugh de St. Albans was set over them and directed them; for while we find the painters spoken of as "painting ymages on the walls," Hugh is described as "disposing the works of the painters working on the disposition of the paintings" and "ordering (designing) the drawing for the painters," and of course we find Master Hugh paid one shilling a day, whereas the other painters receive 10d., 9d., 6d., and 5d. per day, according to their merits, the whole thing being arranged upon strictly commercial grounds. Then Mr. Richmond tells us to go and look at ancient churches and see whether we can possibly convince ourselves "that they were designed by architects, carried out by the trade." Well, we do not need to be convinced upon the subject, because we have documentary evidence of the fact. Mr. Street, who gave special study to this point, says in his remarks upon the position of architects, "In these days of doubt and perplexity as to what is true in Art, it is at least a comfort to find that one may go on heartily with one's work with the honest conviction that the position one (an architect) occupies may be, if he chooses to make it so, as nearly as possible the same as that occupied by the

artists of the Middle Ages. So that, as it was open to them—often with small means, and in spite of many difficulties—to achieve very great works of lasting architectural merit, the time may come when, if we do our work with equal zeal, equal artistic feeling, and equal honesty, our own names will be added to the list which already includes those of artists who have earned the respect and affection of all whose everyday life is blessed with the sight of the true and beautiful works which in age after age they have left behind them as enduring monuments of their artistic skill."

We cannot help noticing the fact that the more we find out about the way in which our ancient churches and cathedrals were built, the greater is the similarity between the Mediaeval and the modern practice. Some years ago it used to be supposed that our cathedrals and churches were all designed by bishops and priests, but no proof of this has ever been discovered; in fact, every document which has been found, points distinctly to the conclusion that our ancient architects were laymen, doing their work for pay, just as at the present day—even the famous William of Wykeham is known now not to have acted as architect to his buildings, and we know the name of his architect.

Can it for a moment be supposed that our great churches were erected by a number of workmen; one doing a bit here and another a bit there, leaving it to chance or fate to weld the thing into one harmonious whole. Can anyone who looks at the interior of Lincoln or Westminster, with their masterly combination of proportion and detail, believe that this is the result of mere accident, and that there was no master-mind at work in its "ordination" and "disposition"?† If one wants to see the kind of thing which a number of workmen, tinkering about without a director (call him "Cementarius," "Magister Operum," "Lathomatos Lapisceida," "Magister fabricæ," or "architect") will effect, let him go to West Walton Church, Norfolk, and see how the exquisite Early English church, evidently a severely architectural work as first erected, has been ruined, not artistically alone, but structurally also, by the fifteenth-century patchings of independent workmen, windows knocked through the "solid," or blocked where the original architect had planned them, responds cut away, buttresses removed, arches left with nothing to counteract their thrust, and consequent fractures, walls terribly out of perpendicular, principals of roofs cutting through the heads of windows, and other works showing how thoroughly one workman can ignore the work of everyone else when left to his own devices! No doubt the thing is picturesque enough, but at the expense of stability and artistic propriety. A ruin is no doubt often more picturesque than a cathedral, yet it would certainly be a sad disaster to Art if our cathedrals were converted into ruins. We are thoroughly convinced that no great architectural work has ever been accomplished without a paid master or director, in other words, an architect, whether he takes his 5 per cent. on the outlay, or, like the old "Cementarius," has a regular salary, with house, clothes, boots, and hats provided. If anything, the 5 per cent. seems to us to be the less commercial arrangement of the two.

Now, let us see what the Mediaeval painters did. Were they above "commercialism"? did they thoroughly despise the "filthy lucre," and was it considered a disgrace in those times for an artist to consider his art as his means of support—(his business, in fact)?

We think we can bring two witnesses forward whom no one can regard as sordid, grasping creatures, the two noblest characters connected with the whole history of Art in the Middle Ages; men whose very

\* Page 465.

† "Ordinatio" and "dispositio" are frequently used to signify "design" in old documents.

\* Street's "Spain," p. 464.



names bespeak implicit admiration, Savonarola and Fra Beato Angelico. Well, what do they say upon the question of commercialism in Art?

We will take Savonarola first. We quote from Crowe and Cavalcaselle's "History of Painting in Italy."\*

"Savonarola thought that the exercise of Art was a profitable occupation for monks, and he was ambitious of introducing it as far as possible into his monastery for purposes of revenue. His persuasion induced miniaturists, painters, and sculptors to join the Dominicans . . . and he was wont to say that independence being better than mendicancy for an order claiming to preach the truth, it was but right to lay the foundations of a better financial condition."

Our next quotation is from Lord Lindsay's "History of Christian Art": "Fra Angelico had not been many months resident at Rome [where he was painting frescoes in the private chapel of Pope Nicholas] before the heat of the summer compelled him to retreat to the mountains. The rulers of Orvieto, anticipating this, and wishing to secure his services, had invited him to their



St. Germain l'Auxerrois, Paris.



Nant.

Fig. 1.

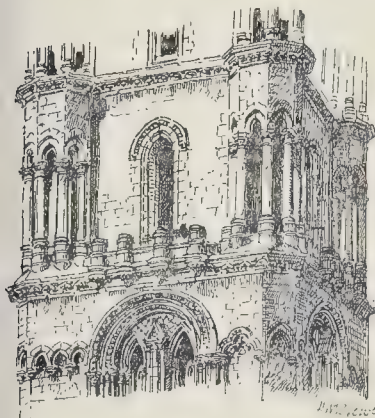


Fig. 3. —Bamberg.



Fig. 4.



Fig. 2. Castle of Stolze, Coburg (1502).

romantic city. He entered into an agreement with them on June 14, 1447, to employ his summer recess of three months every year in painting the Chapel of St. Brizio, in the Cathedral, in fresco, for which he was to be paid 200 gold florins per annum, his pupil Benozzo 7 per month, and two assistants 3 each." Now here we find Savonarola entering into a regular commercial scheme, and Fra Angelico making a financial arrangement for his holidays. And we shall see that Savonarola's enterprise was something very like a shop or factory, for Crowe and Cavalcaselle tell us: † "Fra Bartolomeo was acknowledged as the head of the workshop belonging to St. Marco. . . . Fra Bartolomeo's first care on resuming his duties in St. Marco was to reorganise the atelier. . . . It seems to have been agreed that the Syndic (or Procurator) should provide all current expenses, and that the net profit should be divided with Mariotto. . . . A subdivision of interests also existed; some pictures were finished in the essential parts by Fra Bartolomeo; others were more exclusively Mariotto's; others, again, were the joint result of their labours with additional aid." Now could there possibly be a more thoroughly commercial transaction than this? Here is a kind of Art Syndicate established in a monastery. Pictures are regularly manufactured for gain, and a shop kept for their disposal. These shops were called "Bottega," and in the official catalogue of the National Gallery, under "Botticelli," we read:—

"His extant works are numerous, though

many bearing his name can only be considered as having issued from his bottega."

These quotations could be supplemented by hundreds of others, but we think we have given enough to show most distinctly that artists in the Middle Ages, just as artists in our own time, worked for money, and made business arrangements as are now done.

Our admiration for the great architects and painters of the Middle Ages is in no way shaken or influenced by finding out that they were good practical men of business, that they regarded their works in the light of commercial transactions; why should a painter or an architect be an improvident enthusiast? A thorough want of business qualifications is as bad for the client as the artist (in the case of an architect it is worse). If an artist neglects to take proper precautions, and ignores the rational means of getting paid for his work, he is doing an injustice to those who depend upon him, to his fellow craftsmen, and to Art in general. A man's power of painting, drawing, and designing is as much his means of money-making as the legal knowledge of the solicitor, the medical skill of the doctor, or the stock of the trader; and we cannot help thinking that to attempt to account for the shortcomings of modern Art by suggesting that they are caused by "commercialism," is a mistake, because this has always existed and must exist. The moment an artist is paid for his work, "commercialism" steps in, and if he does his work without asking pay, he ceases to be an "artist" in the generally-understood sense of the word, "one who lives by the practice of art," and becomes an

"amateur," or one who takes up Art simply as an amusement.

If the word "commercialism" is used to signify an unscrupulous, grasping, and unfair method of carrying on the profession of Art, we maintain that these gentlemen are using a totally wrong word, or have rather coined a word which does not convey their meaning; instead of using the recognised English word "avarice." If by "Commercialism in Art" they mean "avarice" in Art we as heartily condemn it as they do, but if so, why coin a new word, of ambiguous meaning, where there is a genuine word in the language, which does express the idea perfectly? If it is intended to convey a charge of avarice against modern painters, architects, or sculptors, we emphatically repudiate the charge. The uphill struggle of a modern painter, the immense amount of theoretical study, and the scrupulous care in execution which goes to the making of modern pictures, alike contradict the assertion. With regard to the sculptor, surely he cannot be accused of avarice when even some of our very best sculptors find it difficult to recoup themselves the expenses which they are out of pocket for their works! And, with regard to architects, we have known innumerable cases in which modern architects have acted with great generosity. While insisting upon being paid according to professional rules, they have, especially in the case of churches in poor districts, made handsome and costly gifts—a pulpit, a font, a reredos, or a porch: and we could tell of cases where builders have done the same thing.

We do not believe for a moment that any

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\* Vol. iii., p. 432.

† Vol. iii., p. 457.



special charge of "commercialism" or avarice can be substantiated against modern artists; and if, as we fear we must own, modern Art is in some respects inferior to ancient, the cause must be sought for elsewhere than in its "commercialism."

#### NOTES.

**T**HE election of Parish Councils throughout England and Wales took place on Tuesday last. For the present we do not anticipate any great changes from this important alteration of Local Government in the rural districts. The Councils have not, after all, great powers, and the amount of their expenditure is carefully limited by the Legislature. The most important results will be seen some years hence, when localities have begun to appreciate the responsibilities of self-government. We look rather for indirect than for direct results. The tendency will be to make agricultural labourers more conscious that they have civic duties to perform, and to give localities more collective self-management. Thus, for example, where in future there is a village hall established by a wealthy landowner, it is probable that it will be handed over to the Parish Council to manage. Before the creation of these bodies such a donor had either to make it over to trustees or to look after it himself, possibly with the aid of the parson. The duty of managing such an institution will help to create a local spirit which could not have hitherto existed. In time, also, we hope to see Parish Councils recognised as the bodies to manage technical instruction in small localities. But for the present things will not show any remarkable change, either for good or ill. In some places we may see recreation grounds and allotments established; in others the village street will be better lighted; in others, again, local circumstances may not be changed at all. But this fact in no way diminishes the great ultimate importance of the change, which must in time create a spirit of local self-government in the rural districts, a body ready to manage any local matters.

**T**HE procedure of the London County Council in regard to the intended new lunatic asylum is one which ought not to be passed over in these pages without special comment. The County Council advertised in August that they were prepared to appoint an architect to carry out the asylum in question at a salary of £800 a year. Considering that an asylum would only take about three years to plan and build, and that the architect appointed was to relinquish all other practice during the time of his appointment, this might be called an exceedingly poor offer, and in fact looks as if it had been prompted mainly by a desire to study economy. However, about eighty architects responded to the application, some of them men whose names are well-known in the profession. A certain number (ten, we understand), were invited to be interviewed by the Asylums Committee, and some among these, who lived in the provinces, were summoned up to London more than once on the business. At the last meeting, as will be seen by our report in another column, the Council, after publicly advertising this offer and giving a number of architects a good deal of trouble in connexion with it, have dropped it, without any apology or explanation to those who answered their advertisement, and propose now to engage an architect, independently of their advertisement, at a fee of £10,000, to carry out the work. Taking the usual cost of a large asylum as the basis, even the sum of £10,000 is considerably less than the architect's commission on the usual terms would amount to; but it is at least a respectable sum, and if the Council can afford to offer that, why did they not offer it at first? And why did they not make up their minds as to their action, instead of beguiling a number of gentlemen

into applying and then casting them off? It is a kind of proceeding by no means creditable to a public body. As to the assumed reason for the change of policy, that none of the candidates were satisfactory, we know that there were two or three men among them of exceptional ability; but the action of the Council has probably been prompted by the rather absurd idea that no man can be supposed to be competent to build an asylum unless he has built one before. Every man who is known as an asylum architect must have built his first asylum once; and innate practical ability to grasp a problem is just as important a factor as experience.

**W**E hope that we are not to take the speech of Mr. Marsland at the Institute on Monday night as a fair criterion of the degree of education, perception, and logic with which the London County Council can be expected to deal with the subject of District Surveying in London. If it were so, one could only conclude that the County Council had sunk hopelessly into the depths of mere and sheer vestrhythm. The assertion of the speaker that the whole of the arguments adduced in the discussion were only on the basis of the consideration of the interests of the architects themselves only showed one or two things—either that he was incapable of understanding the real drift of what was said, or that he had little regard for truth, when there was a "point" to be made in a discussion. One alone among the District Surveyors who took part in the discussion gave any excuse for such an assertion; and certainly that gentleman's remarks as to not giving up their hold over appointments which were so valuable were in the highest degree unsuitable and ill-timed; but no other Surveyor took that tone, and none of the speakers were more decidedly in support of Mr. Carö's position than Mr. E. T. Hall and Mr. Statham, neither of whom is a District Surveyor or has any personal interest in the question; yet we have no doubt that, when the communication from the Institute comes before the County Council, this idle nonsense about interested motives will be repeated. There can be no kind of question that the effect of the by-law prohibiting District Surveyors from practising, if persisted in, must be to place the regulation of building in London in the hands of a class of men far inferior, in professional standing and in independence of position, to the majority of those who held it previously to the enactment of the said by-law.

**T**HE present time is the proper season for the planting of trees and shrubs. It is opportune, therefore, to appeal to those who have charge of the gardens in the squares of London to do something to improve the shrubberies which nearly always encircle the garden. It may be said that, as a general rule, these shrubberies consist of privets and sickly lilacs, and no attempt is made to cultivate any general collection of flowering or picturesquely foliated shrubs. With a little more care and a very trifling expenditure of money, these borders to the squares might be greatly improved. Such shrubs as the hardy purple-leaved plum, the fragrant mock-orange, the various kinds of retinaspora, now quite a common variety, the brilliant kerria, would all flourish in a London square. The list might be largely increased, but the point is that the shrubs of London are practically neglected, and a source of beauty and pleasure is thus lost. We are not asking that delicate specimens of rare shrubs should be planted in the London squares, only that a selection should be made from those which are to be found in every country garden to which any attention is paid. Hardy and beautiful plants should find a place in the now monotonous borders of the gardens of the London squares.

**T**HE twenty-fifth Report on the experiments on filtration of sewage carried out by the Massachusetts State Board of Health has now been received in this country, and those interested in sewage filtration, will find a vast amount of information spread over the fifty pages devoted to the question. The experiments have been continued for six years, and an adequate review of the results would extend over several pages. A large number of filters were employed in the experimental works consisting of sand, gravel, polarite, and other materials, which were dosed with sewage in a great variety of ways. The summary and conclusions are as follows:—

"(1.) Of the three methods given for the removal of sludge—namely, 'sedimentation,' 'filtration,' and 'chemical precipitation'—it is stated that filtration through coarse gravel at a very rapid rate, and with the aid of a current of air drawn through the gravel, gave the greatest purification. Furthermore, it has the advantage that it burns up the sludge to a large extent, and does not call for additional means for sludge disposal."

This method has been advocated in this country by Mr. Santo Crimp, as the result of twelve years' experience on a fairly large scale at Wimbledon; by Mr. Scott Moncrieff, and by Mr. Sidney R. Lowcock, although we believe the last-mentioned gentleman was the first to advocate the use of air as an auxiliary to the filters. In the second edition of Mr. Crimp's work on sewage disposal we find at page 260, the following reference to the Wimbledon straining filters. The filtering material becomes charged with nitrifying organisms, and as a matter of fact nitrates are found in abundance in the effluent, which is also practically free from suspended matter, and is in a highly suitable condition for application to land. An average of three analyses made recently showed that the suspended matters were less than three grains per gallon.

"(2.) The removal of sludge by sedimentation enables filters of fine material to be operated at higher rates than filters which receive ordinary sewage. It appears that it would be advisable to employ sedimentation in many large filters where the sewage is strong and the filters are not cultivated."

"(3.) The aid received from the removal of sludge by chemical precipitation does not appear to be sufficient to justify the additional cost."

"(4.) Of the three filters of fine sand which receive sewage from which the sludge has been partly removed by different methods, No. 12a, received the best purified sewage and gave the highest efficiency both from a qualitative and a quantitative point of view. This filter also is the only one capable of continuing to work at the rates given below."

"(5.) Upon studying the several methods of obtaining a well-purified effluent from sewage, we find that the average rate of filtration for the combined area of Filters Nos. 12a, 15b, and 16b was 320,000 gallons per acre daily for six days in a week. This is the best result yet obtained with the experimental filters, and this system of double filtration, with the aid of a current of air, appears to be capable of application to the purification of sewage on a large scale."

The filter 12a referred to is a filter of fine sand, five ft. in depth, which received the sewage from filters 15b and 16b, both of which were of coarse gravel. Reducing these figures to English measures, and taking the week to mean seven days, the rate of purification is about 228,000 gallons per acre per day, or about forty-seven gallons per square yard. The general tendency appears to be towards the conclusions of the Rivers Pollution Commissioners of this country.

**A**S we have recently had occasion to point out, the utilisation of water as a source of power is a subject which at the present day is exciting very general attention. The principal causes which have retarded the development of this kind of energy, are cheap coal and the great improvements made in the steam-engine during recent years. As a nation we are much behind those on the Continent of Europe in making use of water as a source of power, and, as stated by Mr. John Ritchie in an interesting paper he read some months ago before the Royal Scottish Society of Arts on this subject, in Switzerland, Southern France



and the more mountainous districts of South Germany, most of the streams are used for industrial purposes. In the first-named country some eighty thousand horsepower is thus obtained, and this has already had a sensible effect on the quantity of coal imported. The general principles upon which the construction of turbines are based are now so well understood that these machines have become very efficient, and there is no doubt they will play a very important part in the near future in utilising the water-power of the world.

THE death of Sir Charles Newton removes one of the most remarkable names from the roll of English archaeologists. The great achievement of his life was the discovery of the remains of the Mausoleum at Halicarnassus, the interest in which may be said to be still fresh, for it is only recently that one great room in the British Museum has been devoted to them, and their arrangement and the effort to extract the secret of the design of the whole building from the interesting but incomplete fragments, ranging from sculptured figures down to risers and treads of steps, is still in progress. Sir Charles Newton's reign of many years as keeper of the Greek Marbles at the British Museum was a very remarkable one, partly perhaps because he entered into office at a fortunate time, when the interest of the educated public in Greek archaeology was on the increase, and when there were still large stores of unappropriated matter to draw upon. His knowledge of Greek remains, both in and out of museums, seemed to be complete and exhaustive; he knew where to put his finger, as it were, upon everything that was known to exist. We have heard it said that he harped too exclusively on his one string, but we never remember hearing him drag in Greek archaeology unasked except once, when, at a country house, a beautiful Arab horse was brought out to be looked at, and ridden round a field bare-backed by his master, bare-headed, while Newton looked on delighted, saying, "It's just like the Elgin Marbles!"—as indeed it was, but for the trousers. But in general Newton was a remarkable and unusual combination of man of letters, *savant*, man of the world, and man of society, and was an admirable talker and teller of stories, generally permeated by a delicate flavour of cynicism.

THE Winter Exhibition of the "Society of Painters in Water Colours," opened this week, is characterised by a great variety of interest, though there may be no works to be singled out as specially remarkable. Mr. Alfred Hunt, however, has never better succeeded in giving the effect of light and atmosphere than in "Saltwick Bay" (160), a drawing which must be looked at and studied before all its beauty comes out. Like a good many of this artist's recent contributions to the Gallery it is a little disappointing through slightness of subject, not from any failure to carry out the effect aimed at. Mr. Hughes's large subject from "Straparola" (251), the girl and her snake sister, is so curious and weird as to compel attention, but its merit does not consist in more than careful and painstaking execution. Nude studies are rather rare at the Society's Gallery, and we may notice that there is a second one this year, Mr. Weguelin's "Pelagia" (360), a fine sketch of a woman standing on wet sand in front of the sea; a kind of marine idyll. Mr. Albert Goodwin is topographical rather than imaginative in his subjects, unless we may class his view of "Clovelly" (48) as a work of imagination, for it is certainly not like the real Clovelly, either in colour or scale. Let anyone who remembers the place recall the small stone pier or breakwater there, and look at the size and extent of it in Mr. Goodwin's representation. That does not affect the merit of the work in the purely artistic sense, but

we do think that a picture purporting to represent a place should have a little more reality. One of the most interesting of Mr. Goodwin's drawings is a view of part of Wells Cathedral (246) by night, a fine study of effect, remarkable especially for the delicate manner in which the effect of the light in the interior of the cathedral, seen through the windows, is indicated. Mr. Hemy's boats and seas seem fresher and more breezy, even than usual, notice especially "Three Men in a Boat" (259). Mrs. Allingham is at her best in "Cottage near Freshwater" (202); she contributes only two drawings. Among Mr. Eyre Walker's numerous and always fine landscapes "In Winter" (95), a snow scene, is exceptionally striking; "An Autumn Afternoon" (239) is also a beautiful work. Mr. Phillip's broad and powerful style is better suited perhaps to his favourite class of subject, a great hill filling the picture—see the "Black Craig of Talnoy" (58) and the remarkable look of aerial space over the shoulder of the hill—than to more extended and detailed views such as that "On the Argyllshire Coast" (230), which seems a little bald in treatment. This, however, is at all events a wholesome contrast to the niggling realistic style of some prominent members of the older school. Miss Rose Barton, a comparatively new member, whose small shipping scenes we admired at the Dudley Gallery some little time since, will be an acquisition to the Gallery if she does not make the mistake of attempting too many things at once; she exhibits one shipping subject (69), two idyllic subjects of landscape and figures, one of which (50) is remarkably suggestive, though the drawing of the figure is not over good, and a picture of "Cromwell Road" (328) which is a very successful but too palpable imitation of Mr. Herbert Marshall. However, Miss Barton, who hails from Dublin, is an artist we shall hear more of. Mr. Tom Lloyd contents himself with comparatively small works, with his usual fine harmony of colour, though with little subject. Among other works to be named are Mr. Herbert Marshall's "Chelsea" (4); Mr. Gregory's two views of Chartres, 76 and 200 (the first of which is from exactly the same point of view as Mr. Pennell's view of Chartres published in the *Builder* for January 7, 1893); various small sketches of scenes by Mr. Walter Crane, which are hard in style but have a certain individuality; Mr. Alfred Fripp's powerful sketch of the Campagna from the Via Appia (213), very unlike his usual style; Mr. Cuthbert Rigby's "River Brathay" (249); Mr. Hughes's "Study in Silver Point" (304); Mr. Herbert Marshall's "Norwich" (311); and Professor Herkomer's portrait of Mrs. Hubert Herkomer (344). Among specially architectural subjects are Mr. Rooke's "Sculpture on the West Porch of Chartres" (9), a very carefully executed piece of architectural drawing; Mr. Allan's "Goes, Holland" (19), not carefully executed in detail, and the gazabo on the central building out of perspective; Mr. Hodson's "Piazza d'Erbe, Verona" (60); Mr. Thorne Waite's "Enkhuizen" (98); Mr. S. G. Evans's "Bambridge" (138); Mr. Goodall's "Church of San Giovanni et Paolo, Venice" (223); and Mr. Rooke's "Carving on the House of the Sulmon," Chartres (284).

SEVERAL works of importance by Mr. A. Bruce Joy, the sculptor, have been on view during the last week, at his studio in West Kensington. Of these we may mention the statue, ten ft. six in. in height, of Mr. Oliver Heywood, which forms a companion to the sculptor's statue of Mr. John Bright, and which is to stand in front of the Manchester Town Hall. Mr. Heywood is represented standing in an easy attitude, and the pose of the head is well treated. Modern garb certainly does not lend itself to sculpture treatment, but if we must have it we doubt if it can be treated more naturally than we here find it. The statue of Mr. Whitley, M.P., which is to be placed in St.

George's Hall, Liverpool, is seven ft. in height, being for an internal position, and of necessity in keeping with the scale of the surroundings. The general treatment is somewhat similar to the last, the figure standing restfully with the weight on one leg, and with the trousers—the *bête-noire* of modern sculptors—so managed as to fall in folds, which help rather than detract from the anatomy of the legs. The memorial of Professor Adams, which is to be placed in Westminster Abbey, consists of a medallion about one ft. six in. in diameter, and shows with graceful and refined handling the characteristic contour of the discoverer of Neptune. It is probably in these medallion portraits that modern portrait sculpture is most successful. The bust of the same subject for St. John's College, Cambridge, is also well conceived, while the memorial to Sir Robert Montgomery, to be placed in St. Paul's Cathedral, takes the form of a medallion about one ft. three in. in diameter, the features being executed with careful and delicate gradation. The bust of Chauncey Depew, the American orator, is executed with considerable vigour, the strongly-marked features lending themselves well to a characteristic and striking likeness.

A PROPOS of the "New Woman" movement, the following extract from Millar's papers on the Castles of Forfarshire is interesting. Amongst the records of the cost of painting the chapel, dining-room, hall, and bedchambers of Glamis Castle in 1688, is written:—"Besides De Witt there were two English women, Mistris Moreis and her sister, *house-painters*, who have been a considerable time here." (See McGibbon and Ross on "Architecture of Scotland," Vol. ii., p. 123.) The name of these "English Women" is suggestive.

ONE of the claims which any eminent author has on posterity is that his name should be correctly spelt. We notice in "A. A. Notes" a mistake which we have come across in other quarters lately, as to the name of the author of the "History of Architecture," which is there spelt "Ferguson"; a mistake, perhaps, arising partly from the fact that there is a well-known living architect of that name. The author of the "History of Architecture" was "James Fergusson," with the double "s."

#### THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A MEETING for business and the election of new members of the Royal Institute of British Architects was held on Monday last at 9, Conduit-street, Mr. F. C. Penrose, M.A. (President) in the chair.

Mr. W. D. Caröe then raised a question connected with the Statutory Examination for Certificates to act as District Surveyor, and referred to the "regulations" of the County Council making it prohibitory for a District Surveyor to practise as an architect. After introducing the subject, he said the London County Council might be sure that the architects were ready to go hand-in-hand with them in any action they might take to prevent any possibility of a recurrence of abuses possible under the old Act, always provided such action did not impair the quality of the men appointed to the posts. But the only abuse which the declaration would check would be the relegation of his duties, on the part of the District Surveyor, to his clerk. With regard to the question of emoluments, on this point he believed that Mr. Douglass Mathews could give some valuable evidence, as he had been over twenty years District Surveyor of Stoke Newington. For several years Mr. Douglass Mathews had received 500*l.* a year in fees, but these had fallen last year to 87*l.* He could only congratulate Mr. Mathews on the fact that he had not had to sign the declaration, and would point out to the London County Council, and to the Surveyors who were appointed under the declaration, that they were likely to have some difficult questions to settle. The London County Council had endeavoured to give a distinct legal sanction to the declaration by adding words to the clause em-



powering them to appoint, subject to such conditions as the Council should think fit. On the other hand, the amendment proposed by the Duke of Westminster, and which was supported by the Royal Institute of British Architects and other institutions, was thrown out. At the same time, Section 37 of the old Act had become Section 144 of the new Act, the District Surveyor being prevented practising in his own district, and acting as District Surveyor for any works under his private control. He had heard it said that the present action of the London County Council was illegal, but he would not express an opinion on the point of law, because the County Council had the power to make the signing of the declaration compulsory, and he had no desire to say that a man should not be bound by what he had signed. It was sufficient to say that in the past there had been a splendid roll of names of those who had acted as District Surveyors, and where so many were still with them, it would be invidious to mention a long list. He would like, however, to mention Thos. Henry Wyatt and Professor Donaldson as the sort of men they would like to see occupying these important posts. He was afraid, however, that it would be impossible to get this type of men, unless they were permitted to have private practice. It would be impossible also to secure an efficient class of men, except they could get responsible and practising architects, who could deal with problems of construction and work under the Act, as well as supervise its operations. It would be an easy matter to make definite rules as to the status of the Assistant Clerk, if it was necessary to have one. There was no doubt that the District Surveyor should be prevented practising in his own district, whether on his own account, with a partner, or competing for works in that district. It was argued in the House of Commons that the lack of candidates for examination would cure itself; but could anything be more disastrous than to make bad laws and then leave them to be repealed by the necessity created by their badness? It had also been argued from the point of view of architects, that it was against their own interests that District Surveyors should be allowed to practise, but it was desirable that the Surveyors should be in touch with the practice of architecture. Nothing would be gained by this discussion if they got into opposition with the London County Council, who had the power to take the examination out of their hands if they chose. Let them at least credit the County Council with a desire to improve the public service, and endeavour to point out as forcibly as possible, but in a friendly spirit, that the action taken by them was, in the view of the members of the Institute, a mistake. He would, therefore, propose:—"That this meeting is most desirous of seeing the high status of the District Surveyors maintained, especially having regard to the increased responsibilities placed upon them by recent legislation."

The President said that he would like to state most emphatically his entire agreement with Mr. Carie's last observation, that they should speak without any degree of acerbity of the London County Council. It was most probable that the points which they had brought forward, and which were not exactly in accordance with the views of those present, had been pressed, not from any wish to be nasty—if he might use that expression—but from ignorance of what was really the best and most politic course.

Professor Roger Smith said he had great pleasure in seconding the resolution proposed by Mr. Carie, and in thanking him for taking the trouble to bring the subject before the members. His paper in the main had been devoted to advocating what many of them had advocated very strongly—the great desirability of, if possible, returning to the old system, which enabled the District Surveyor to act as a practising architect. Anyone who had had the opportunity of carrying on architectural work in a country town must be aware of the kind of official they had to fall in with. The officer of the local municipality, who devoted his whole time to the duties of his office, was not, generally speaking, so conversant with building, and so formed in his judgments upon architectural points, as the District Surveyors of London were. That was largely due to the fact, he believed, that the District Surveyor who had a greater or less share of architectural practice was more in touch with the necessities and the difficulties of building. It was of importance, therefore, that the officer who had the control of the work of the builder should be well acquainted with it. There was also a matter of importance to every architect, growing out of the point they were there to deal with more especially that evening.

Shortly after he was appointed a District Surveyor, and when very young to the work, a large public building was being erected in his district. The builder became bankrupt, the architect died, and the proprietors, who were no doubt anxious that the work should be finished in a certain time, drove on, engaging their own foreman and workmen. For many weeks he was the only professional man connected with the undertaking, all kinds of points were submitted to him, and had he not had some little experience of the responsibilities of an architect he believed he would have been beaten altogether. Now the Building Act placed the conduct of public buildings in London very largely under the control of the District Surveyor, and his experience with regard to the public building he had just referred to might be the experience of any District Surveyor who might be appointed.

On that ground, therefore, he was a great advocate for the maintenance of the connexion between practice and this appointment, which had hitherto always been maintained. With regard to the examination, the examiners tried to ascertain to some extent the practical qualifications of the candidate, as well as his knowledge of construction and theory. He was bound to say, referring to the suggestion made by Mr. Carie in his paper, that if the District Surveyorship was to be thrown open to all the Associates of the Institute, they, or some other similar Board, ought to have the opportunity of testing the qualifications of the candidates, if they were to be in any way responsible. They were all indebted to Mr. Carie for bringing the matter forward, and he hoped that members of the Institute would consider it as a matter which, not only as regards London, but also as regards England generally, was of great importance. London practice was to a large extent copied all over the country. The old London Building Act was the model on which the model by-laws were fixed, and the practice of London had filtered over the country. He believed that if the Institute could succeed in recovering for its members the position they occupied with regard to this office up to 1890, it was exceedingly likely that the same kind of thing might follow in the country.

Mr. Douglass Mathews said he agreed as to the undesirability of introducing anything like acerbity into the discussion, and he was glad to say that there had been nothing of the kind existing between the London County Council and the District Surveyors during the time the Building Act was before the House. He was sorry that this paper was not read before the Institute six or twelve months ago, for, if it had been, they would not have had to deplore the Clause, which was introduced into the Bill. It would be remembered that a petition was presented by the Institute to the Committee, suggesting various alterations, but that petition, for some reason, was never followed up. Counsel was never instructed, but if they had only been properly represented before the Committee all the opponents of the Bill would have been with them. The agent of the Duke of Westminster tried at the eleventh hour to get the Clause reconsidered and taken out, and he so far succeeded in having the Clause re-instated as on a former occasion. It was a great pity that the Institute did not follow up its petition, but the harm had been done. He hoped, however, that the London Council, after the statements that were made, would consider it desirable to withdraw the undertaking which they asked from the candidates for the District Surveyorship. He could fully appreciate that some District Surveyors trusted matters rather to their clerks, which was, of course, an undesirable thing. Speaking of the District Surveyors he came in contact with, he could say that there was no body of men who interested themselves more thoroughly in the difficulties of complying with the Act. The District Surveyors, as a rule, tried to overcome the difficulties presented to them by their architectural brethren, and a great deal of the ease under which the Act had been administered, was due to the desire to put forward as few obstacles as possible, and to assist those who might not have so much experience as themselves. As to the results of the examination, he was not at all surprised; the only surprise he felt was that they had not a lower class of men offering themselves for the examination. No man with any degree of respect could undertake the office on the conditions offered by the London County Council. In many cases the incomes of District Surveyors had been reduced from 50 to 75 per cent., and few men would care to take an office, which was so exceedingly variable, while the inducements to a man with any aspirations were not enough. He hoped a resolution of this

kind would be put forward to the London County Council, and they would be shown that there was really necessity for it.

Mr. T. H. Watson said it occurred to him that perhaps a committee of the Institute might consider the subject, and the conditions imposed on candidates, and so arrive at some practical way out of the difficulty.

Mr. H. H. Collins thought that the whole question lay with the London County Council, and not with the Institute. The District Surveyors naturally, in the crucial question which had arisen, had looked for protection, support, and assistance from the Institute, but Mr. Mathews had told them how far their expectations were in any way realised. In fact, it had been left to the Builders' Institute, to the Institute of Surveyors, and others to come and assist them. The District Surveyors' Association, with their modest funds, had assisted, while the Institute of Surveyors had expended 900*l.* to support the petition, and he thought they had considerable cause of complaint against the Institute, that they had been deserted in a case where they ought to have been backed up. They need not dwell on the fact that the action of the London County Council had reduced the number of applicants to zero. Nobody thought it worth their while, except some clerk or inferior man, to go in for the examination, with the prospect of starvation before him. It was absurd to suppose men of any education, position, and practice, could afford to take a District Surveyorship under the present condition of things. It had been his good fortune to have met gentlemen who occupied the presidential chair of the Institute, and it would be very disagreeable for such gentlemen to have to meet some jack-in-office, who had no authority of his own, but who must rush off to Spring-gardens before he could give an answer to a plain question. That was what the matter was coming to. The Act was a difficult one, which would puzzle generations of architects for some time to come, and would afford the courts opportunities of giving judicial interpretations. What they wanted was a body of men who had experience to advise in their own profession, and who could interpret rather the spirit than the absolute reading of the Act, such as they had had in the past—men who read between the lines, who were able to assist their brethren and cut off many of the angularities which new Acts continually presented. He hoped the London County Council would see the necessity for having educated men to fill the position—he meant men who were educated not only as architects, but in the ordinary sense of the word—men of the world, who were able to meet their fellow men, and make use of their intellect, even behind an Act of Parliament.

Mr. Benjamin Taberner was sure the London County Council could have but one object in view—namely, to secure the best men to carry out the important duties of the office. He was certain, therefore, that the more they looked into the question the more they would see that the system they had adopted was not the one to secure this aim. He rejoiced that the question had been raised, and he hoped it would lead to further discussion and examination so that an alteration would be effected. He did not think they could have more eloquent statistics than those Mr. Carie had prepared and displayed on the wall. It was evident that the inducements held out would not draw in men who were fitted to carry out the duties of the office.

Mr. H. H. Statham said he had not much to add to what had been said on the subject, beyond expressing his concurrence with the opinions put forward by Mr. Carie in his paper, and he would only make one remark. He had some reason to think there was every likelihood of a recommendation, in the direction which had been pointed out that evening, being considered by the London County Council. He believed there was a very considerable party in the London County Council who were coming to the conclusion that their by-law was a mistake, and if a strong resolution was forwarded from the Institute, he thought it would probably receive every consideration, and perhaps be the one influence which would sway some of the waverers. They might see there was that sort of feeling on the County Council, from the fact that they had not attempted to incorporate the clause debarring surveyors from practising in the Act. When he read the Act he came to the rather hasty conclusion that they had abandoned it; and the by-law, though it had been passed, had, he believed, only been passed as a matter of business routine. He thought it would, therefore, probably be found—and he was speaking with some reason, from conversations he had with members of the County Council—



that there was every disposition to reconsider it, and that any recommendation from the Institute would have a chance of having weight. There was, therefore, all the more reason why they should take up a decided line.

Mr. Alexander Payne said he would like to make a practical suggestion to Mr. Caröe. The resolution hardly went far enough; it only stated that it was desirable that the status of the District Surveyor should be maintained. He believed the answer of the County Council would be that that was precisely what they wished to do, for they were really under the impression that by increasing the size of the district and debarring the Surveyor from practising, the status would thereby be increased. It was impossible for anybody who was not an architect and connected with building to see how detrimental the conditions imposed by the Council were to the position. He believed he was correct in saying that amongst the Surveyors who had been appointed since 1890, there was no man of great eminence as a practising architect before his appointment. He did not wish to say anything against his colleagues, but he thought it necessary to bring this forward. If the County Council wished to get a good class of men to take the office they must not be debarred from private practice, and he thought the resolution should be amended by saying that the District Surveyor should have this permission.

Mr. Chas. Foster Hayward said he was prepared to second such an amendment.

Mr. Bruce, L.C.C., remarked that he had come by invitation to hear Mr. Caröe's paper, but he had no qualification himself to speak on the matter. It was true that he was a member of the Sub-Committee who had charge of the Bill, but he had looked at it from entirely the point of view of the duties of the office. He was glad to hear what had been said from the point of view of Mr. Caröe and the District Surveyors they had heard that evening. In those matters, in which he was personally interested on the County Council, there was a case which, at first sight, would appear to be parallel, and where great advantage had accrued to London through the establishment of an arrangement such as this—he referred to the Medical Officers of Health. Undoubtedly there had been great advantage in the rule which was now so frequently adopted, that the Medical Officer of Health should not take private practice. In that case, the Districts were better looked after than they were, but there was this great difference, that the salary of the Medical Officer of Health was a permanent one, and did not depend on the amount of work he might have to do.

Mr. John Marsland said he had come there rather to listen than to take part in the discussion. As a member of the Building Act Committee, he was responsible to some extent for one of the regulations complained of. At the same time, he had listened to no argument why they should take that resolution off the books, except that it would be for the benefit of the Royal Institute of British Architects. That had been stated as the opinion of every gentleman who had spoken. They had not heard any opinion from members of the Institute, who were independent, nor from any of the younger members, who might hope to be District Surveyors as well as private practitioners. He was rather struck with the remark of Professor Smith, when he said that, when one had practised in a country town, one was surprised at the status of the men who acted as District Surveyors. That was the very reason why they should insist on the District Surveyor being a qualified man, and attending to his own duties. Very often he had had to meet the District Surveyor's clerk, when it would have been more satisfactory to have met the District Surveyor himself. Indeed, he knew there were some districts in London where the District Surveyor was never seen, except in a question of dispute, and that seemed to him a reason why the District Surveyor should do his own work, and not employ a clerk. The only way, it seemed to him, to remedy this, was by passing such a resolution. He ventured to state that, so far as appointments had been made since the alteration had been in effect, they had been as satisfactory as any which had been made before. For his own part he did not think he would have the opportunity of considering this matter again, for it was not his intention to come up for re-election on the Council, but he thought the Institute should support their recommendation when it came up, with some better arguments than he had heard that evening, if they wished it to be successful.

Mr. E. T. Hall said that reference had been made to the small number of younger members

present that evening, but he was afraid the reason, to a large extent, was, that they, aspiring to be practising architects, had no interest in the subject. They must all agree with Mr. Marsland's view, that it was improper the District Surveyor should employ his clerk to do his work. At the same time, it should be remembered that the clerk was simply there by the courtesy of the architect and builder, to report to his principals, and if he took an improper position the only thing for the builder or architect to do was to ask him to leave the works. It had been said that they, as an Institute, should look after these appointments because they were valuable to the members. He hoped it would be repudiated that the Institute took so low a view of its public duty; for if the Institute said they were there to safeguard appointments for the benefit of the members, the sooner they ceased to be members the better. He presumed, in the action they had taken, they had been guided by far higher views. They had recognised that they were responsible to the public for matters appertaining to building law in London, and had endeavoured to sink their own interest in trying to get a good Building Act for the Metropolis. All who had been thrown into contact with the Building Act Committee of the London County Council knew that their earnest desire had been to make an improvement on the previous Act. They had been most desirous of listening to advice from those who could advise them; they had amongst themselves able men, who knew a great deal about building; and their desire had been, even in this regulation to which exception was taken, to improve the status of the District Surveyors. But the point of view from which they, as practising architects, approached the matter was, that the District Surveyor was a gentleman who, from his position, should act in many cases as a sort of judge of first instance. Now, under the new Act, increased responsibilities were thrown on the Surveyors, and among other things the fact that a public building must be constructed to the satisfaction of the District Surveyor. It might be the case that the County Council would erect a fine building, which would adorn London, and which might be in the district of a young District Surveyor, who had had no practice in designing such a building. Was it desirable, then, that a matter like this should be left to the discretion of a young man, who had simply passed his examination? He considered it desirable, on the contrary, that the District Surveyor should be a man who had passed through the fire of considerable practice before he took office. Such a man had often to deal with all sorts of intricate questions, and he would say, without the slightest reproach, that a young man could not have the experience which would entitle him to the weight he should possess in the administration of the Act. Their argument, therefore, was, that in the new responsibilities which were thrown on the new Surveyor under the Act, it was necessary to have a man of power, and he had been explained that in former times they had such men as Professor Donaldson, while, at the present time, they need not look far from that room to see eminent members of the profession who were District Surveyors. If this regulation, which said that men must not practise, were withdrawn, a better class of men would go in for the post. He thought that was the whole sum and substance of their argument, and that the difficulty might be met if the County Council could make some regulation stipulating that a man, before he became a District Surveyor, should have been in practice at least a given number of years. The examination he had to pass would test his qualifications, and the Council would receive, as it were, a diploma of his being able to undertake the grave responsibilities of his position. If the regulation could be amended somewhat in that way it would meet all the necessities of the case. He hoped Mr. Marsland would give them credit for the fact that they were seeking, not the interest of their members, but the capable administration of the Act.

Mr. Lacy W. Ridge remarked that, having had experience during the whole of the time covered by the placard on the wall as to the statutory examination, he felt he had one argument to put forward which was well worthy the consideration of the London County Council. The twenty-five men who had come up since the regulation was passed had not been at all on a level with the seventy-two men who had come up before. The table gave no idea as to the quality of the men, but he could safely say that since the break there had not been a single architect in any appreciable practice who had presented himself

for examination. If he had done injustice to any who had passed by making that remark he hoped he would be forgiven, as the case might have slipped his memory. The impression left on his mind was that no practising architect had presented himself at this examination. He only wondered that the thing had not got wind, and that they had not had plenty of candidates of an inferior class—by which he meant the kind of men met with as local surveyors in country towns or districts. Anyone who had had work to do in country towns knew the extreme difficulty of dealing with men of that class. He admitted that in the large towns there might be surveyors quite on a level with the London District Surveyors, but that was not the case generally throughout the country. If they, then, in London were to have District Surveyors of the class he had referred to, it would be a misfortune of the greatest possible kind to building—a misfortune to them as architects, a misfortune to the public who built, and, ultimately, a misfortune and disgrace to the local authorities who brought this about.

Mr. B. Dicksee said that what they ought to do was not so much to find fault with the County Council and their regulation as to show them in what other way to attain their object. What the County Council were afraid of was not the want of capable men, but that they would not have men who attended to their duties. There was a clause in the 1855 Act, which was re-enacted in the new Act, stating that where a District Surveyor, through pressure of business or any other cause, was unable to carry out the work of the district, the County Council might appoint an Assistant Surveyor who would receive the fees for what he did. He thought this was done once or twice by the old Metropolitan Board, when a District Surveyor got very old, and the power still remained at the present time. There would not be the slightest objection to putting in the declaration that the District Surveyor personally should carry out the duties of his office, but as long as he did that he could not see why, if he had not signed the declaration, he should be debarred from carrying on any practice. He had signed the declaration, and he was willing to abide by it as long as it was in force; but he thought it would be wise if the County Council were to modify the regulation.

Mr. William Woodward bore testimony to the assistance given by the Royal Institute of British Architects in regard to this matter. Mr. Arthur Cates had also brought to bear, in connexion with the Surveyors' Institute, all the points which he would have brought to bear had he been asked to represent the Royal Institute.

Mr. W. Henry White said that the aim of the Institute should be to assist in every possible way in bringing up the status of the London District Surveyors. Mr. Hall had made an excellent suggestion, which could be borne in mind in any action which might accrue, and any recommendation which might be put forward in the County Council. He had never known a case where a District Surveyor was not accessible to anyone, if not at the moment, at any rate by an early appointment.

Mr. C. H. Brodie thought that the young men of the Royal Institute were being sat on, and without the slightest reason. They were first twitted that they had not come down in their hundreds to this meeting, but what interest had they in the question? Were they to come and condemn a policy which they did not feel the slightest interest in? And for this reason, was it worth the while of any one of them to take up the examination, and do their utmost to secure the position, for a salary of something like £77 a year? It was all very well to say that the District Surveyor should attend to that, but as had been pointed out, he might not be able to do it all. Every architect employed assistants, and every business man did so in his business, but in the case of the District Surveyor the senior should be accessible.

Mr. Payne wished the resolution amended as follows: "That this meeting is most desirous of seeing the high status of District Surveyors maintained, by permitting them to practise privately as heretofore, under such restrictions as may be thought necessary, especially having regard to the increased responsibilities placed upon them by recent legislation."

Mr. Caröe said the reason why the resolution was put in the form in which it first appeared, was that they did not think they were the final body in the matter, and they did not wish to appear in any sense to dictate to the County Council. At the same time, there was no doubt that the cause of the falling off in the examina-



tion was due to the effects of this declaration. The members of the County Council would appreciate that they did not wish to dictate to them, and in that sense he was willing to accept the amendment. He was very sorry to hear Mr. Marsland affirm that they had not produced any evidence for the alterations they wished made. Mr. Marsland surely had not seen the table on the wall, or carefully listened to some of the arguments which had been brought forward, and he hoped, when he saw the discussion in print, he would reconsider the view he had taken. He was aware that the action of the Royal Institute had not been as strong as might have been desired, because they had not the funds for doing so. Mr. Cates did not give evidence, for the honourable reason that he was a member of the tribunal of appeal, and did not feel he ought to appear before the Committee on this special question. He (the speaker) appeared and gave evidence in the House of Commons Committee as a member of the Council of the Royal Institute, and he hoped, therefore, the District Surveyors would not feel so hardly against the Institute as they had felt that evening. The instance mentioned by Mr. Bruce, with respect to the Medical Officers, was on an entirely different footing, and he hoped the County Council would reconsider their determination.

The resolution, as amended, was then unanimously agreed to, and a vote of thanks to Mr. Caroe was carried.

Mr. Collins asked whether the resolution would be referred to the Council of the Institute, or remain a dead letter?

The President replied that the resolution must come before the Council of the Institute, who were bound to carry out the wishes of the general body. He further intimated that the next meeting would take place on Monday, 17th inst., when Professor Banister Fletcher would read a paper on "The London Building Act."

The proceedings then terminated.

#### MAGAZINES AND REVIEWS.\*

The *Art Journal* opens with an article by Mr. Claude Phillips on "Delacroix," whose power and reputation, forgotten for awhile, are beginning to be remembered again now. Mr. Phillips' estimate of the artist, a very high one, though not without perception of his faults, is probably correct. He points out that the French painter's real powers can only be estimated by those who study him at the Louvre, or seek him out in the public monuments of Paris. In the succeeding article, on "Art and Mr. Whistler" (unsigned), we cannot at all concur, except as to the permanent persistence of Mr. Whistler's artistic style; for the rest, he appears to be praised exactly for the qualities, or some of them, which he has not. An article on ancient Cambodian art, by Mr. John Thomson, is of interest from an architectural point of view, and includes among its illustrations what the author states to be the first plan to scale which has been made of the Temple of Nakhon Wat. The number shows for a frontispiece an engraving of Sir J. Millais' "Little Miss Muffet."

The most important article in the *Studio* is one on "Eugène Grasset and Decorative Art in France," by M. Octave Uzanne. The numerous illustrations from Grasset's designs are of the highest degree of cleverness, let us say, rather than genius; their variety in decorative treatment and effect is, however, very remarkable. An article on Dinan by Miss Nancy Bell has some charming sketches by Mr. Arthur G. Bell. Among other articles is one on "Some Views on Photography, by a Painter." The writer, Mr. A. Hartley, takes an exceedingly just and sensible view of his subject, pointing out the real uses of photography to the artist and the danger from trusting too much to it, and summing up thus: "With the form of the flower we want something of its fragrance, with the form of the leaf something of its tremor, and with the bending of the reed something of the breeze before which it inclines; and these are things which the camera wots not of." A sentence which we commend to the notice of the people who get up "photographic salons" and pretend that they are artists. An illustration of "a new Belgian monument," that to Charles de Coster, by Mr. Charles Samuel, shows the monument to be a fine conception in spite of some rather tawdry

\* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

rococo detail. It shows two bronze figures seated in a *laissez-faire* attitude, their feet hanging down, in a niche in the architectural erection which forms the framework of the design; a curious fancy, but certainly original and striking.

The *Antiquary* continues the articles on English glass-making in the sixteenth and seventeenth centuries, commenced in the last number. The other articles in the number are rather of antiquarian than architectural interest.

The *Quest* is a small magazine printed at the press of the Birmingham Guild of Handicraft, of which three numbers are to be issued annually. It is got up in the mock-Early-Renaissance style which has become a fashion in some publications professing of this kind, and in a decorative sense the print and make-up is very good of its kind, but the promoters of the magazine had better go in "Quest" of something better in the way of art than the ridiculous figure-drawing shown in the frontispiece, with heads about half the right size in comparison with the bodies.

In the *Engineering Magazine* (New York) Mr. G. M. R. Twose writes an article on "Uses of Terra-Cotta in Modern Buildings," some of the illustrations to which will be of interest to English architects as showing novelty in the decorative treatment of the material. The author rightly urges that it demands a perfectly different treatment from carved stone, and emphasises the point by an illustration of a doorway in Late Gothic style, labelled "Terra-cotta or Stone—Which?" It is a bad design, we may observe for either material, but certainly suggests stone.

In the *Atlantic Monthly* Mr. C. Howard Walker writes an article on suggestions on the architecture of schools. Without denying that practical planning, sanitation, and ventilation are the first points to be considered, he urges that these are not incompatible with good architecture, which is unduly neglected in school buildings, even in regard to so simple a source of effect as the grouping of windows. We gather from this that school architecture in the States receives less attention than in this country, where its picturesque side is certainly not neglected. The writer suggests, as the styles lending themselves best to school architecture, Elizabethan, Jacobean, and "actual Queen Anne, not the spurious American version." He also suggests the study of the architecture of some of the smaller French towns in Normandy and the Loire neighbourhood. Classic forms of architecture he considers too rigid for school buildings except in the case of very large schools, and where there is plenty of money to spend on architectural effect. There is nothing in the article which will be new to English architects, though apparently the considerations offered are supposed to be novel in America.

The *Nineteenth Century* includes a dual article on "New Sources of Electric Power," by Mr. B. H. Thwaite, C.E., and Mr. J. Munro, C.E. Mr. Thwaite propounds what appears a rather Utopian scheme for burning all coal on the coal-fields to produce electric power for transmission, instead of sending the coal about the country by rail; and Mr. Munro suggests a similar use for Scotland, of the peat deposits on Rannock Moor, and other similar tracts of country.

The *National Review* includes an article by Mr. Claude Phillips on "The National Gallery," being mainly a criticism, evidencing a great deal of careful study, in regard to the artistic value of recent acquisitions to the Gallery, and the question as to the real authorship of some of them. It is an article worth the careful attention of all who are interested in our National collection. To the same number Miss Jekyll contributes an article on "House Decoration," characterised by much good sense and sound judgment, of which the keynote is the recommendation of simplicity and restraint. "Those who have practical experience in house decoration know how much easier it is to go wrong by doing too much than by doing too little. It is the commonest fault of the trade decorator. He will use three tints where one is better, and if left to himself is sure to over-do everything;" an opinion in which we entirely concur.

Under the title "A Threatened City," Mr. Rees Davies gives, in the *Fortnightly*, some account of his impressions of Tientsin and Peking, which do not seem to have been agreeable. The first impression of Peking at a distance and through a cloud of dust, is favourable, but inside "it is like other Chinese cities, a glorified village of one-story houses," with unpaved, ill-smelling streets and open sewers. The walls, built centuries ago, appear to be still worthy of remark.

In the *Gentleman's Magazine*, Mr. J. Beames deals with the sanitary condition of a typical

Indian city; "Sanitary Struggles at Pankobil." There are many Pankobils, each characterised by its slimy wooden structures; its tanks for drinking-water supply, seldom or never cleaned, and the banks of which are covered with ordure; its miasma from rotting vegetable matter, &c. The community of themselves can do nothing, for they have no money to do it with; nor have they any belief in English sanitary ideas. It is not a local question, urges the writer, it is a sanitary danger to the world, and something should be done—he does not say what. But it is obvious that whatever is done must be by English means and English money.

Harper, like the other American magazines, is more occupied in December with readable articles for Christmas than with art (though why art should be out of place in a Christmas number we do not know), but Mr. Abbey's illustrations to the "Taming of the Shrew" are more successful than some others of his attempts to realise Shakespeare's characters; his "Petruchio" is capital.

In the *Century* Mr. Timothy Cole writes a brief but well-considered article on Van Dyck, as accompaniment to engravings from two of the Anglo-Dutch Masters' portraits. The same number contains a reproduction of a sketch of "The Adoration of the Shepherds," by M. Dagnan-Bouveret.

*Scribner's Magazine* contains a very appreciative and feelingly-written article on Mr. G. F. Watts, by Mr. Cosmo Monkhouse, with a number of fine illustrations of the painter's works. There is also an article by the late Mr. Hamerton, the last of a series he had contributed on twelve representative modern painters, which has a special interest on account of the recent death of its author. The artist treated of is M. Emile Friant, whose curious but highly original picture, "Cast Shadows," is illustrated as a frontispiece to the number.

In the *Essex Review* (quarterly) Mr. Chancellor contributes to his articles on Essex Churches a description and plan of All Saints', Retford.

The reprints of *Punch Pictures* continue to appear monthly, and quite maintain their interest.

#### THE SANITARY INSPECTORS' ASSOCIATION.

At the meeting of this Association, held at Carpenters' Hall, London-wall, on the 1st inst., Mr. F. H. Cheesewright read a paper on "The Economic Treatment and Disposal of Town Refuse." Mr. Thomas, Chairman of Council, presided. After glancing at some of the attempts to cope with the refuse question and the difficulty of finding a perfect solution of the problem, so important from the sanitarian's point of view, of disposing of all the refuse of a large town in such a manner as not only to extinguish one nuisance without creating another, but to effect the operation with, if possible, a margin of profit, the lecturer arrived at the conclusion that the attempts to produce a cremator capable of perfect combustion hitherto made in the great towns of this country had been failures of a more or less complete and costly description. He then laid before the meeting a description of the invention of a French engineer, known as the "Livet" furnace, which in using refuse as fuel was able to generate steam and to maintain it at a constant pressure. It was claimed for the furnace that while successfully cremating any substance containing carbon the generator would evaporate three pounds of water for every pound of refuse, and give a residuum of clinker amounting to 30 per cent. The leading peculiarity of the "Livet" system is the form of flue, the area of which increases as it nears the exit into the chimney, in order to utilise to the full the increasing density of the gases, while promoting a high velocity of the air passing through the furnace-bars, and effectually extracting all the heat from the retarded gases before they reach the chimney. The chimney-shaft carries out the same idea of expanding diameter, which, where the interior diameter at the base was 5 ft., would have a diameter of 6 ft. at the height of 100 ft. from the base. It is claimed as the result of careful experiments that a speed of draught of from 700 to 800 ft. per minute, when burning house refuse, is kept up through the fire-bars, resulting in a very high temperature being constantly maintained in the furnace. The power to cremate 33 lbs. of refuse per square foot of grate surface per hour had been demonstrated, and an installation similar to one at Halifax destroyed 12 tons per day under perfect conditions as to



non-emission of smoke, or the fine dust so often found a nuisance in former cremators, while evaporating water sufficient to produce steam to drive an engine of 180 h.p. Figures were adduced to show that, comparing the experiments of Sir Lyon Playfair, under Admiralty instructions, and Mr. Lavington E. Fletcher, for the Lancashire and Cheshire Coal Association, made with Lancashire boilers, the "Livet" gave a much higher evaporation of water per pound of coal, consumed double the quantity of coal per foot of grate, and consumed a much greater quantity of air per pound of coal, than the Lancashire boiler in the most favourable tests. Among other remarkable calculations made was one showing that the combustion of 40,000 tons of rubbish per annum (about the capacity of the Halifax Cremator) on the "Livet" system, would raise 44 million gallons of water 100 ft. high every day (sufficient for over 2,000,000 inhabitants) at a cost of only 6s. 8d. for steam for every million gallons, against 10s. per million gallons, which was stated as the present cost with the best engines. The result of a six hours' test in another case, during which it is stated that neither smoke, dust, nor odour emanated from the chimney-stack 110 ft. high, gave 3,755 lbs. as the quantity of matter burnt, producing 4'59 lbs. of water evaporated for every pound of refuse actually burnt, the pressure maintained in the steam produced being 50 lbs. to the inch. The weight of clinker and ashes produced was 1,939 lbs. In concluding his paper the lecturer invited the Sanitary Inspectors to visit, at Monck-street, Westminster, a partial installation of the "Livet" system, which had been for some months past supplying steam for driving a mortar-mill, engineers' lathes, dynamos, &c., without costing a penny for fuel.

On the proposal of a vote of thanks, a discussion arose, in which the Chairman, Mr. Alexander (Shoreditch), Mr. Dee (Westminster), Mr. Tidman, C.E., and other members took part, several of the speakers expressing a preference, wherever it was practicable, for methods of refuse disposal like that in use at Liverpool, which consisted of sending it out to sea every day by special steamers that could rapidly dump it into the sea at a point from which it could never return.

A conference of members, which was of a private character, followed.

## THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

**Appointment of Architect for the Sixth Asylum.**—The Asylums Committee brought up the following adjourned report:—

"The Council on July 3 last instructed us that the cost of the new asylum exclusive of site and furnishing must not exceed 300,000*l.*, and that we were to engage 'an architect, to be paid by salary, and the necessary assistants to prepare the plans and supervise the erection of the proposed asylum.' To meet the Council's views, we invited by advertisement applications for this appointment, for which we offered a salary of 800*l.* per annum. Sixty-nine candidates responded, and their applications were carefully considered by the sub-committee, to whom we delegated the duty of submitting to us the names of ten selected candidates. These gentlemen were in due course seen by us, and we came to the conclusion that none were suitable in every respect for this very special and responsible post. Having failed to obtain an architect under such conditions, we feel it our duty to ask the Council to rescind its instruction to us in this matter. The provision of the new asylum is now becoming a matter of the greatest importance, and we think, as the speediest plan for obtaining this accommodation, the Council should agree to the engagement of an experienced architect on the understanding that the whole remuneration for his services shall be 10,000*l.* We have further to point out that we have made careful inquiries into the cost of asylum buildings, and we are now of opinion that an efficient modern institution for 2,000 patients cannot be built for 300,000*l.* We think the limit should be 175*l.* per bed—i.e., 350,000*l.* exclusive of site and equipment. We accordingly recommend—

(a) That the latter part of the resolution of the Council of the 2d July, 1894, as follows, be rescinded:—

"That it be an instruction to the Committee that the cost (exclusive of site and furnishing) must not exceed 300,000*l.*, and that they engage an architect, to be paid by salary, and the necessary assistants, to prepare the plans and supervise the erection of the proposed asylum."

(b) That, subject to an estimate being submitted by the Finance Committee, the Committee be authorised to expend a sum not exceeding 350,000*l.* in providing the new asylum (excluding cost of site and equipment), and that

the Committee be authorised to engage an architect experienced in asylum construction, to design and superintend the erection of the new asylum, on the understanding that his remuneration in lieu of all commission and charges shall be 10,000*l.*"

Mr. Strong, in bringing up the Report, said that the Committee had endeavoured to obtain the services of an experienced man at a fixed salary of 800*l.* In answer to advertisements, some seventy candidates applied to the Committee, but after interviewing the best of the candidates selected, the Committee felt that they would not be justified in recommending any of them as architects for the new asylum. The Committee now proposed to engage an architect in the ordinary way. No doubt 10,000*l.* seemed a large sum of money to pay for his services, but they should remember that that sum would include payments to a large number of assistants—draughtsmen and others. In the course of his remarks, Mr. Strong, referring to the urgent need for the new asylum, said that last year there was an increase of 843 pauper lunatics.

Mr. McDougall said that he approved of the Council's instruction of July 3, but since he had been defeated in Committee, and as the new asylum was urgently needed, he would not press his opposition.

Mr. Beachcroft proposed to refer the recommendation back. He said that last year the Council decided to employ an architect at a salary in order that he might be under their control, so that they might be saved the extravagances that took place in connexion with Claybury Asylum. He believed that if the Council agreed to the Committee's present recommendation the cost of the asylum would eventually amount to 450,000*l.* It was not the duty of the Council to provide palatial establishments for the insane; their responsibility ceased when they had made the unfortunate patients reasonably comfortable.

Mr. Leon seconded the amendment. Mr. Emden said that it would not be possible to carry out a work like the proposed hospital by any other than a thoroughly experienced architect, and no architect of such experience would be willing to accept a sum of 800*l.* a year for four or five years; for it would mean that he would have to give up his practice for that time, and that afterwards he would have no practice of his own.

After some further discussion the amendment was put and lost.

Mr. Doake proposed the addition of the words "Shall not exceed 10,000*l.*" in the last line of the recommendation.

This was accepted by the Chairman of the Committee, and the recommendation was then passed.

**Tramway Purchase.**—The Highways Committee recommended:—

"That in all agreements for leasing tramways on the north side of the Thames, acquired or to be acquired by the Council, provisions be inserted to ensure that the undertakings shall revert to the Council on December 31, 1900 (but giving power to the Council, but not to the lessee, to determine the agreement on, or at any time after, December 31, 1898, by three months' previous notice), by which date nearly all the principal tramway-lines on that side of the Thames will have come under the operation of the purchase clause of the Tramways Act, 1870; and that similar provisions be inserted in all agreements for leasing such tramways on the south side, the date of reversion to the Council being, however, in those cases December 31, 1903, instead of 1900."

Mr. Westcott moved to refer back the recommendation, contending that the Council had no right to bind its successors in such a matter.

The amendment was negatived, and the recommendation of the Committee agreed to.

**Jobbing Work.**—Paragraphs I. and II. of the Fire Brigade Committee's report were as follows:—

"We have had before us accounts rendered by the Works Department in respect of work executed during the last financial year at various fire brigade stations. In the undermentioned cases the cost of the work has exceeded the estimates adopted by the Council:—

Station.	Work.	Architect's estimate adopted by Council.	Excess.
Blackheath	Painting, alterations, and repairs	6 £ s. d.	
Tooley-street	Drainage	209 40 1 4	
Row	Painting, and repairs	120 13 9 11	
Chief station	Alterations, &c.	80 1 1 7	
Hamstead	Repair of roof, &c.	10 1 1 1	
St. Marking-out	Repairs and painting	65 14 6 1	
Bethnal Green	Ditto	5 4 4	
Bishopsgate	Ditto	60 10 3 10	
Brixton	Ditto	53 106 8 1	
Battersea	Ditto	67 101 7 11	
		293 75 0 4	

In the last case additional work of the value of 6*l.* was ordered, and the architect's estimate must therefore be increased by that amount. As regards

the Brixton Station, the work charged for includes not only that estimated by the architect to cost 67*l.*, but also other work subsequently sanctioned by us, the cost of which the architect estimated would be 10*l.* The architect has reported his revised estimate of the whole of the work to be 94*l.* 19*s.* With respect to the remaining stations the architect reports in effect that he is unable to understand why the work has cost so much. We have been in communication with the Works Committee on the subject, and have discussed the matter with the architect and the manager of the Works Department. These officers, however, are at variance as regards the manner of interpreting the specifications, under which most of the work above mentioned was executed, and as the expenditure has actually been incurred we do not see what further can be done in the matter. We understand that a schedule of prices for jobbing work is being prepared, and it is hoped that when work is measured up and priced in accordance with such schedule the disparity between the architect's estimate and the cost of work will disappear."

"Among the accounts rendered by the Works Department are the following in respect of work sanctioned by us, the architect's estimate having been in each case below 50*l.*—

Station.	Work.	Architect's estimate.	Cost of work.
Chief station	Repairs	24 £ s. d.	73 0 11
Scotland-yard	Painting	34	55 1 1
Camden Town	Alterations	37	80 16 9
Hackney	Provision of bath-room	27	57 14 5
Bow	Formation of coal cellars, and alterations	24	66 7 8

With regard to the work at the first three stations, the architect reports that he is unable to account for the excess, but in the other two cases he states that he is satisfied that his estimates were too low, and he has consequently increased them to 45*l.* and 42*l.* respectively."

**The Empire Theatre.**—The Theatres Committee brought up a report in reference to the alterations to be made at the Empire Theatre, which was adopted.

**London Exhibitions, Limited.**—The same Committee's report contained the following paragraph, which was agreed to:—

"We have considered five drawings, dated November 24, 1894, showing the internal arrangements of the auditorium building, now known as the Empire Theatre, at the London Exhibitions, Limited (formerly the National Exhibitions Buildings), Earl's Court. The drawings for the building itself were approved by the Council on January 30 last. The seating accommodation will be for 3,796 persons instead of for 5,100 persons as at first intended, as it is now proposed to only have one tier which will be divided into two parts by a barrier. Four staircases, each 6 ft. wide, will be provided for the use of persons using the upper division of the building, and they will deliver directly into the grounds. A stage which will run the whole length of the building is also shown. We recommend—

"That the five drawings, dated November 24, 1894, be approved, provided the construction of the trusses supporting the seating be carried out to the entire satisfaction of the District Surveyor, and that the work be carried on with the plans be sanctioned within six months."

**Town Hall, Deptford.**—It was agreed, on the recommendation of the Building Act Committee, to grant the application of Messrs. Murray & Foster, on behalf of the Vestry of Rotherhithe, for the consent of the Council to the erection of a town-hall on the north-east side of Lower-road, Deptford, at the corner of Neptune-street and also abutting upon Moodkee-street.

**Artisans' Dwellings, St. John's Wood.**—The application of Mr. A. R. Stenning, on behalf of the Manchester, Sheffield, and Lincolnshire Railway Company, for the consent of the Council to the erection of artisans' dwellings in Grove-road, St. John's Wood-road, and Cunningham-place was also granted.

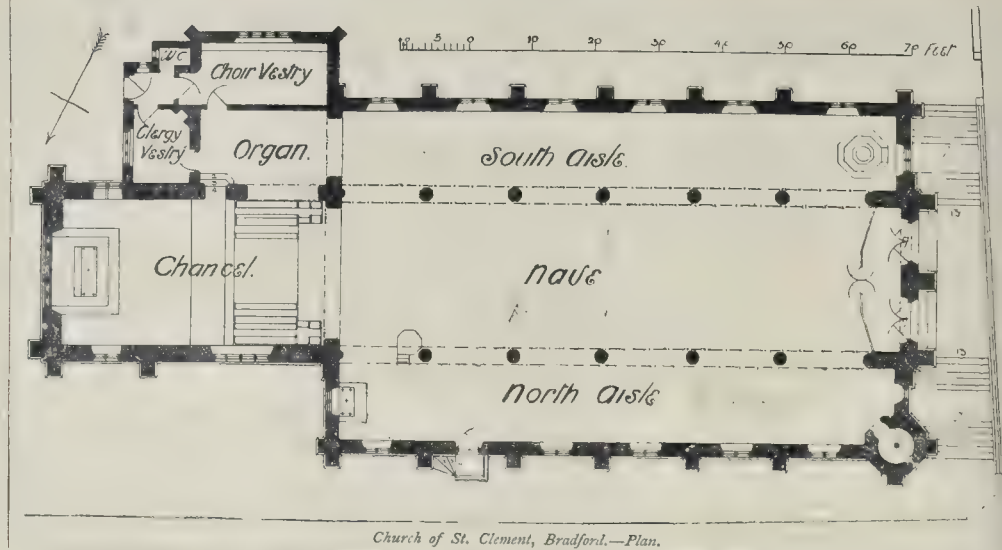
The Council adjourned soon after 9 o'clock.

**ARCHITECTURAL ASSOCIATION.**—The drawings in illustration of Mr. E. O. Sachs's paper on Friday week on "The Modern Theatres of the Continent," will be on view this (Saturday) morning at the rooms of the Institute of Architects, from 10 to 12.

**THE INSTITUTION OF CIVIL ENGINEERS.**—At the ordinary meeting of this Institution on the 4th inst. Sir Robert Rawlinson, K.C.B. (President), in the chair, it was announced that 21 Associate Members had been transferred to the class of Members, and that 102 candidates had been admitted as students. The first ballot for the Session 1894-5 resulted in the election of 5 Members, 130 Associate Members, and of 4 Associates, amongst the latter being Mr. Charles Barry, F.R.I.B.A., of Westminster.

**CHANGE OF ADDRESS.**—Mr. Henry J. Dowden, surveyor and land agent, has removed his offices from No. 314, Regent-street, W., to No. 8, Craig's-court, Charing Cross, S.W.





### THE BUILDERS' BENEVOLENT INSTITUTION:

#### ELECTION OF PENSIONERS.

THE election of two pensioners on the funds this Charity took place on the 29th ult., at the offices of the Institution, 35, Southampton-row, Bloomsbury-square. Mr. Basil P. Ellis (President) occupied the chair, and, amongst other friends of the Institution, there were present Mr. Geo. Plucknett, J.P. (Treasurer), Mr. C. Bussell, Mr. J. T. Bolding, Mr. T. Stirling, Mr. T. Stirling, jun., Mr. T. F. Rider, Mr. C. E. New, Mr. R. Perkins, and Mr. J. W. Scrivener. There were two vacancies for pensions—viz., for one man and one woman, there being one male and seven female applicants.

At the close of the poll, the scrutineers (Messrs T. Stirling and T. F. Rider) announced the result, which was as follows:—Jack Taylor, Bermondsey, aged 62, master slater, 135 votes; Sarah Elizabeth Drake, Tylers' and Bricklayers' Almshouses, Balls Pond, aged 64, widow of Francis Drake, builder (seventh application), 3,273 votes; Mary Ann Healing, Curtain-road, aged 64, widow of Samuel Healing, builder (fifth application), 590 votes; Maria Elizabeth Powell, Camberwell, aged 61, widow of G. T. Powell, late a pensioner (second application), 1,976 votes; Mary Ann Bowley, Tylers' Cottage, Balls Pond, aged 67 (first application), 569 votes; Eliza Ellis, James's-street, W., aged 75, widow of E. G. Ellis, builder (first application), 1,126 votes; and Ellen Batchelder, Carshalton, aged 61, widow of Chas. Batchelder, builder (first application), 580 votes. The successful candidates were therefore Jack Taylor and Sarah Elizabeth Drake.

Votes of thanks were passed to the chairman and the scrutineers, and the proceedings terminated.

#### COMPETITIONS.

**BOARD SCHOOLS, STROUD GREEN.**—In the competition for the new Stroud Green Board Schools for 1,235 children, Messrs. Mitchell & Butler's plans have been selected, and the work is to be proceeded with at once.

#### ARCHITECTURAL SOCIETIES.

**NORTHERN ARCHITECTURAL ASSOCIATION.**—The members of the Northern Architectural Association held a meeting in the Masonic Hall, Toward-road, Sunderland, on the 1st inst., when Mr. Frank Caws, F.R.I.B.A., read a paper, entitled "The Architect." In the absence of the President of the Association (Mr. Joseph Oswald), the chair was taken by Mr. William Milburn, of Sunderland. Mr. Caws having dealt with some aspects of the development of architecture, addressed himself to the youngest

members especially. In the course of his remarks he said that before the young architect could hope to draw his dream, which was unseen, he must learn to correctly portray the dreams of other architects which had been petrified into solid substance and visible forms. No power of imagination, no strength of conception, could compensate the architect for weakness or non-proficiency in the art of drawing. The young architect should talk little and draw much. He should have no mercy on himself short of acquiring that absolute harmony and working understanding between eye and hand by which alone his thoughts could take shape and permanency. Having by severe self-criticism—an essential habit to the successful student—and by untiring dogged perseverance, become, at a comparatively early stage of his education, an accomplished draughtsman, a young architect during the same period of preliminary training must necessarily have become proficient in the science and practice of linear perspective. The genuine architect always, he said, thinks in perspective, while the self-styled architect thinks in mere plan or elevation. In order to transfer his dreams from paper to timber, brick, iron, and stone, the architect must further learn how to draw, so to speak, with the plane, trowel, hammer, and chisel, his pictures in the open air, by the hands of the carpenter, bricklayer, smith, and mason. To do this he must acquire practical and scientific knowledge. He must become a geometrician and mathematician. He must also become a man of business. The motive was sufficient. The student would come to understand that nothing short of perfect artist plus perfect engineer could constitute the perfect architect. A discussion followed, and the meeting closed with votes of thanks to Mr. Caws and the chairman.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—The general monthly meeting of this Association was held in the Rooms, 114, West Campbell-street, on Tuesday evening, the President, Mr. A. N. Paterson, in the chair, when Mr. Charles J. Davidson read a paper on "The Planning of Farmhouses," being a continuation of the series of essays on planning contributed by members. Dividing the subject into three classes:—Sheep farms, dairy farms, and stock-rearing farms, the different requirements of each were explained in great detail. The buildings connected with sheep farms were few, and consist usually of a house for the farmer, with small barn, wool-house, and poultry-house. Dairy farms for the keeping and rearing of cows were more elaborate. The byre was the largest of the buildings, and along with the dairy and scullery formed the principal feature of the steading. In a stock-rearing farm the principal object was to provide for the accommodation and rearing of large numbers of cattle. The arable land of such farms was cropped mainly for the purposes of fodder and bedding. In referring to

the domestic arrangements, it was remarked that in no department of farm-planning was reform more urgently required than in the sleeping apartments appropriated to farm servants, which were, in a large number of cases, such as merited extreme reprobation, and were disgraceful to the farmers and their landlords. In the disposition and grouping of the various buildings the leading object to be arrived at in the arrangement of the plan was economy of time and labour in the performance of the work to be observed were 1. That there should be an immediate connexion between the buildings and apartments whose usefulness depended on each other; and, 2. That houses used for analogous purposes should, as far as possible, be classified and arranged together. Treating of the architectural appearance of farm-houses, Mr. Davidson said that in some cases the whole steading could be arranged symmetrically and where this was not attainable, the extended lines of buildings, the varying outline caused by different heights, and the numerous gables, seldom failed to give a certain degree of piquancy and picturesqueness. The paper was illustrated throughout by reference to a number of plans and diagrams hung upon the walls.

#### BIRMINGHAM MASTER-BUILDERS' ASSOCIATION.

—The annual meeting of this Association was held on the 28th ult. at the offices, 17 and 19, Colmore-row, under the presidency of Mr. Thomas Barnsley. The annual report stated that the depression of trade referred to in the last annual report continued, but the progress of several large works in the city—notably the new General Hospital, the Technical Schools, and the railway extensions—had provided a fair amount of work for the operatives in several branches of the trade. The year had been an uneventful one, no matter of importance having disturbed the amicable relations existing between employers and employed. The committee had held the usual meetings during the year, and the standing committees, with the stonemasons and bricklayers, had met several times and satisfactorily disposed of minor disputes. The committee, after carefully considering the matter, decided not to give notice to the operatives of any alterations in existing rules. The same unwillingness to disturb the existing state of affairs appeared to have prevailed with the operatives, no notice having been received from any branch. The report was adopted, and Mr. T. Barnsley was re-elected President, Messrs. T. Roybotham and R. Bulley vice-chairmen, Mr. George Twigg treasurer, and Mr. E. J. Bigwood secretary.

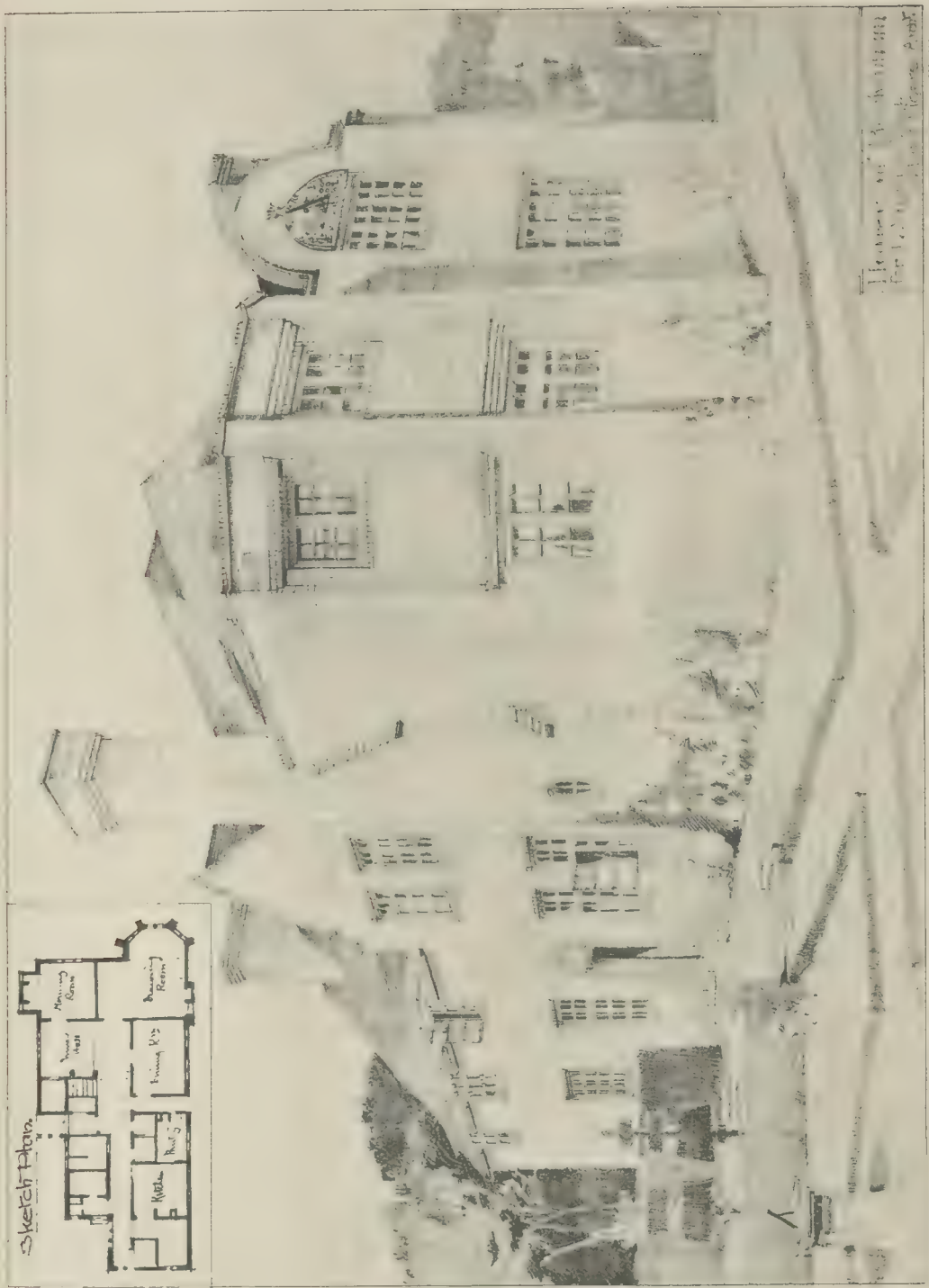
**INDEPENDENT CARPENTERS' AND JOINERS' SOCIETY.**—The Council of this Society ask us to state that they have no connexion with the "Free Labour Association," with which their Society has apparently been supposed to be in alliance.

**MANCHESTER SHIP CANAL.**—Messrs. Blacklock & Co. (Manchester), send us a useful and interesting map of the Ship Canal, accompanied with plans of the Manchester Docks connected with it, and sections of some of the principal basins and wharves, &c.





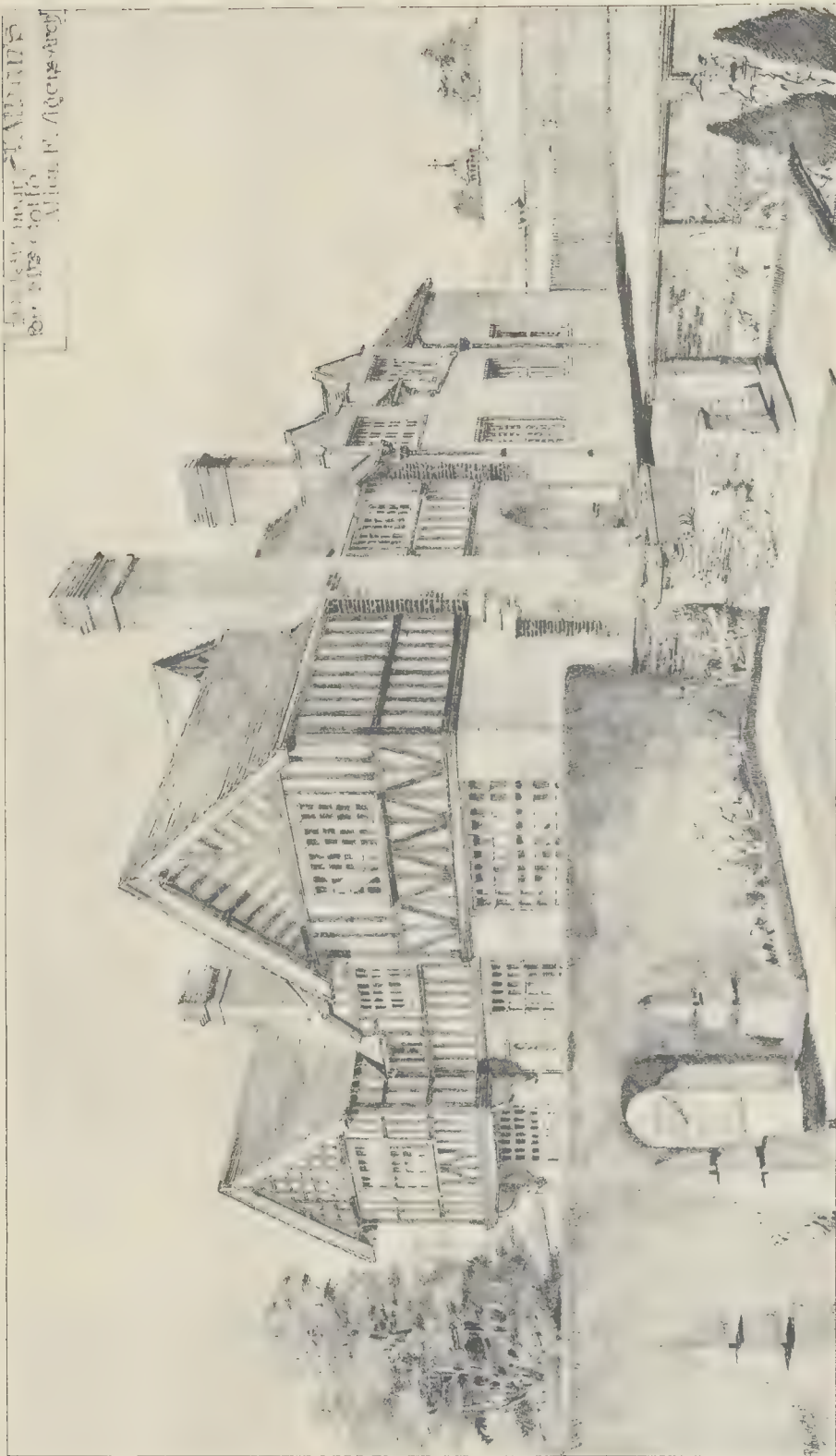
THE BUILDER, DECEMBER 6, 1894



House of the Architect  
for the City of New York  
1894



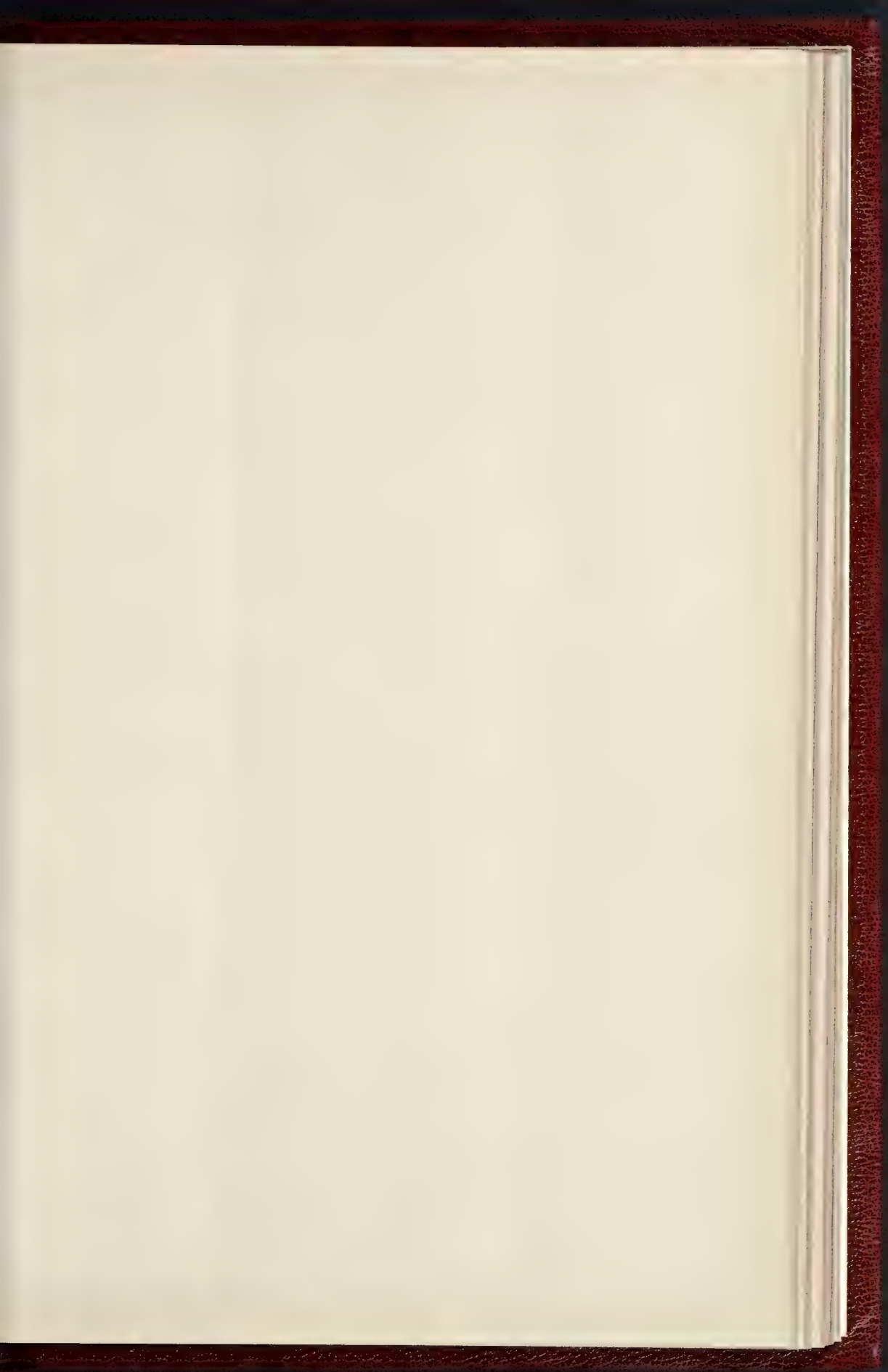
THE BUILDER'S  
OFFICE  
ALICE M. ARCHER



Royal Academy Exhibition, 1894.



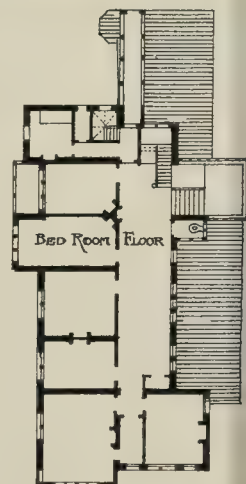
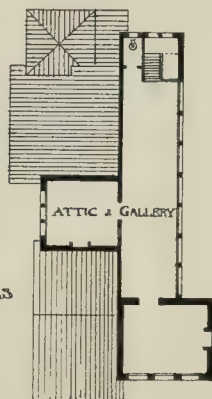






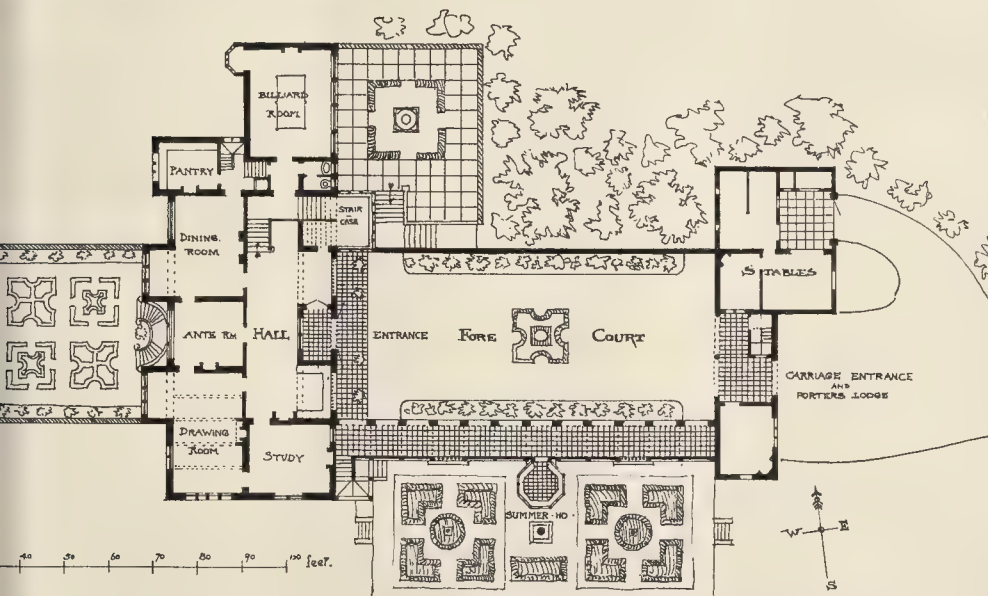
A COUNTRY RETREAT  
WITH TILED ROOFS  
AND ROUGH CAST WALLS

AND N. PRENTICE ARCHT.



Scale of 10 5 0 10







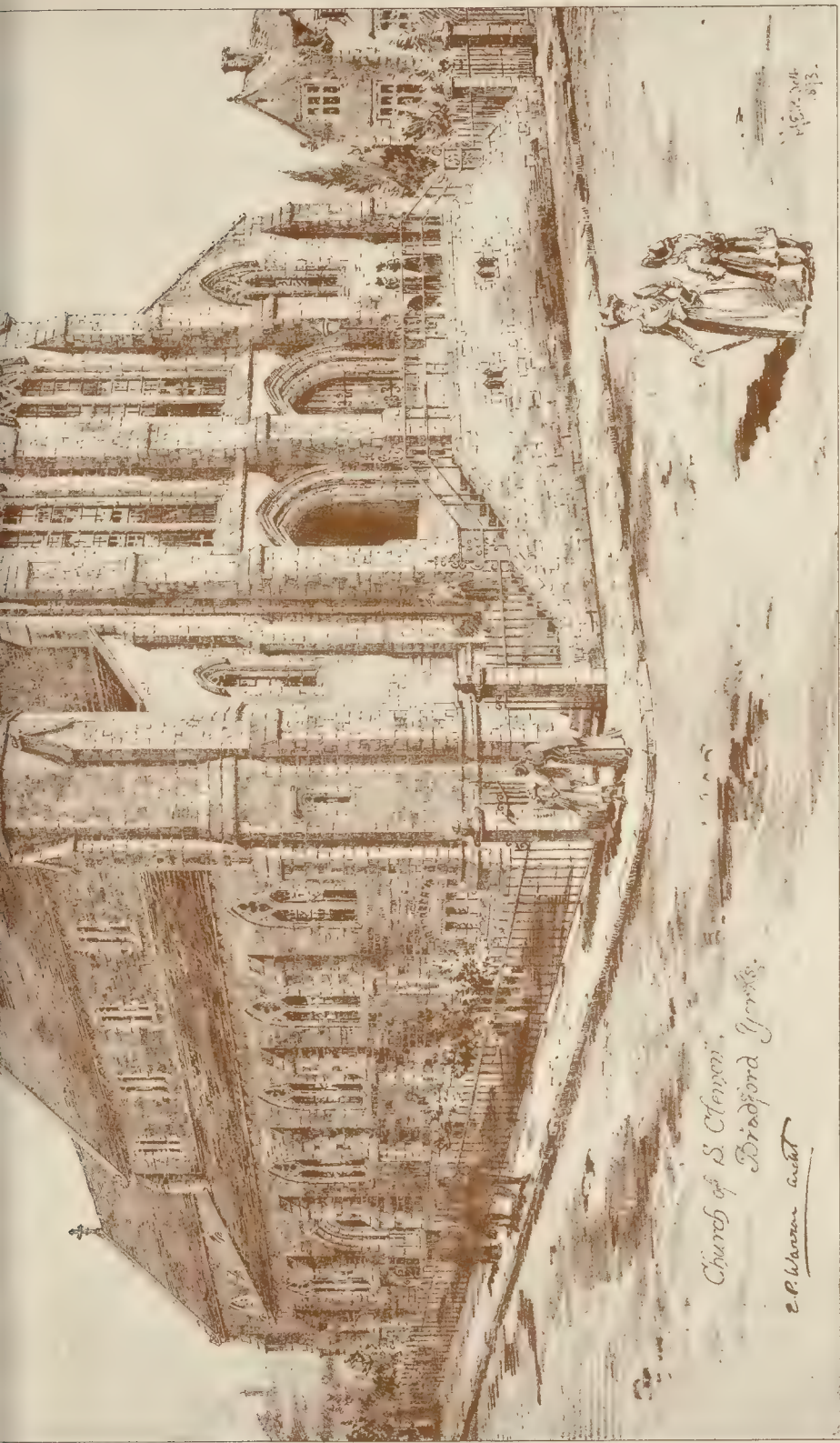




THE BUILDER. DECEMBER 8, 1894



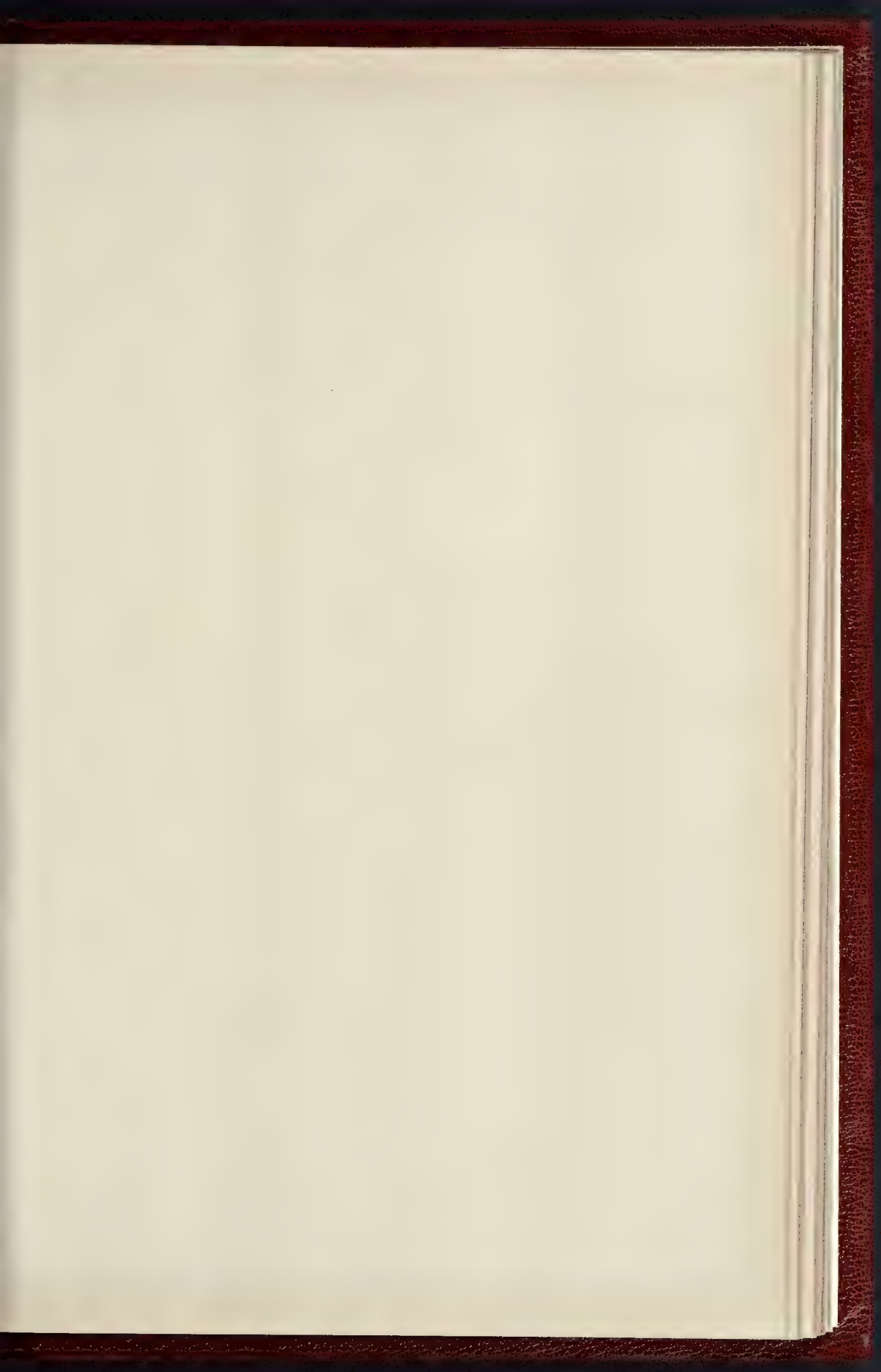




Royal Academy Exhibition, 1894









ONE ASH, LOUGHBOO



R 8, 1894.



INN. PHIL. SPRAGUE & SONS EAST HARTFORD, CONN. REST. J. TERLANE, E.C.

SUDEN, F. R. B. A., ARCHITECT





## Illustrations.

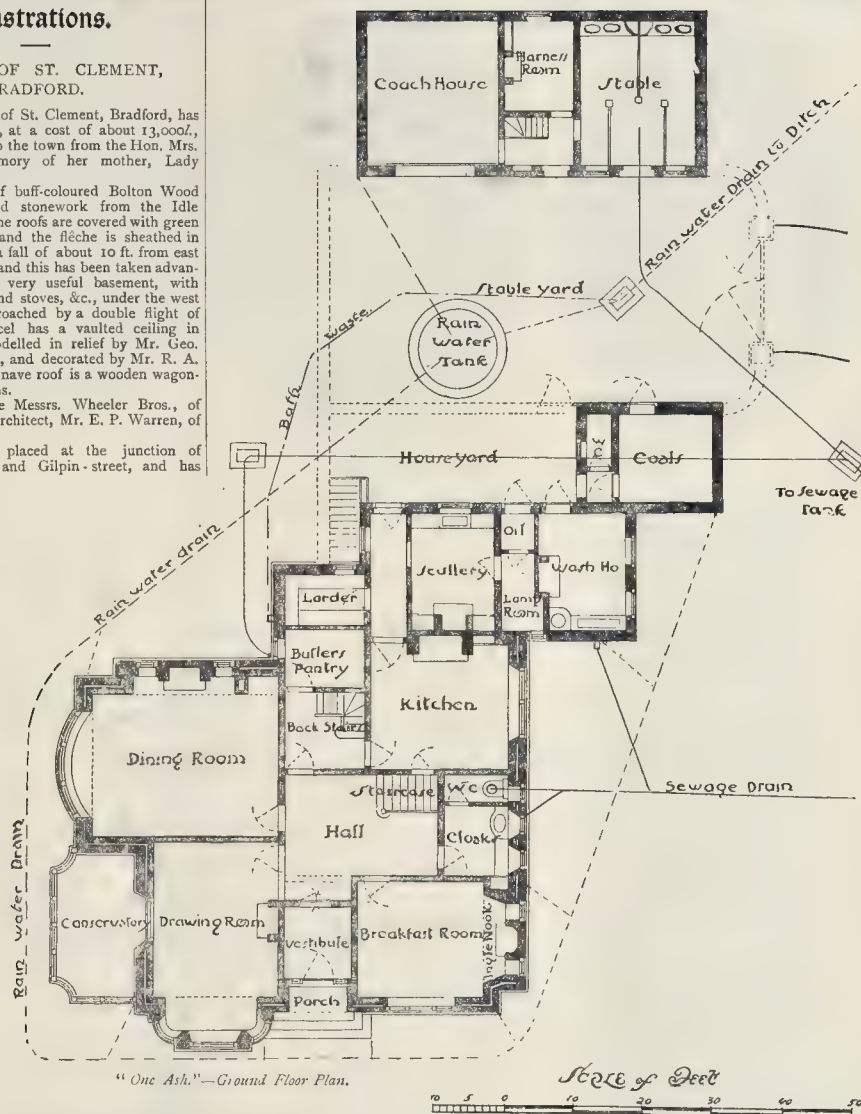
CHURCH OF ST. CLEMENT,  
BRADFORD.

**T**HE Church of St. Clement, Bradford, has been built, at a cost of about 13,000*l.*, as a gift to the town from the Hon. Mrs. Whittuck, in memory of her mother, Lady Mountgarret.

The walls are of buff-coloured Bolton Wood stone, with dressed stonework from the Idle Moor quarries. The roofs are covered with green Buttermere slates, and the flèche is sheathed in copper. There is a fall of about 10 ft. from east to west in the site, and this has been taken advantage of to form a very useful basement, with heating chamber and stoves, &c., under the west end, which is approached by a double flight of steps. The chancel has a vaulted ceiling in fibrous plaster, modelled in relief by Mr. Geo. Frampton, A.R.A., and decorated by Mr. R. A. Bell. The internal nave roof is a wooden wagon-vault with tie-beams.

The builders are Messrs. Wheeler Bros., of Reading, and the architect, Mr. E. P. Warren, of Westminster.

The church is placed at the junction of Barkerend-street and Gilpin-street, and has



accommodation for 540 in the nave and aisles and 30 in the choir.

## "ONE ASH," LOUGHBOROUGH.

THIS house, nearing completion, is situated on the Leicester road from Loughborough to Quorn, and commands a fine view of Beacon Hill and the adjacent wooded country. It occupies a site of about 17 acres, through which a straight carriage-drive, planted to form an avenue, approaches the house. The garden, orchard, &c., will be laid out formally—not in the so-called landscape-gardening style.

The ground-story is faced with varicoloured waste slabs from the neighbouring ancient Swindleland slate quarries, no longer worked—through the craze for cheap Welsh slates by jerry or purely commercial builders. The upper story and minor parts are faced with Ellis & Partridge's (Leicester) 2½-in. Woodville sand-stocks—an admirable brick—luck pointed white.

The roofs are covered with Handford hand-made stout brindled roofing-tiles, and the stone used is brown Matlock, coated.

The fire-grates used are Teale's, Elsley's, and Carron "eighteenth century." The drawing-

room overmantel is a bas-relief of the Poet and the Three Fair Dames *du Temps Jadis*, with the lines from Villon:—

Dictes-moy où, n'en quel pais  
Est Flora, la belle Romaine;  
Archipiada, ne Thaïs  
Qui fut sa cousine germaine;  
Echo parlant quand bruyet on maine  
Dessus rivière ou sus estan,  
Qui beaulté eut trop plus qu'humaine?  
Mais où sont les neiges d'antan!

The three compartments of the staircase-window each contain a cartouche with emblematic head of Love, Peace, or War. These we illustrate from Mr. Ross Kean's cartoons. The Gateshead Stained Glass Company have executed this work.

The works have been carried out under the personal superintendence of the architect, Mr. Larner Sugden, of Leek, by Messrs. W. Moss & Son, builders, Loughborough. The heating apparatus is by Messrs. Haden & Son.

## A COUNTRY RETREAT.

THIS building is modelled after the form of the famous palace of the Generalife, at Granada, with modifications to suit our northern climate, while

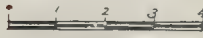
the arrangements of rooms, &c., have been made similar to those of an English country house. The scheme was drawn out with a view to its erection on a site situated on the side of a hill, advantage being taken of the various slopes for the formation of old-fashioned terraced gardens and sheltered nooks.

The entrance is approached from a forecourt of sufficient size to permit carriages to draw up at the door. Another proposal was to glaze in the whole of the forecourt behind the covered gallery, connecting the entrance with the porter's-lodge, and with the addition of a central water-basin, surrounded with palms and flowers, to form a charming winter-garden. The materials to be used were common rubble, or rough stone-walls, coated with rough-cast, to be whitewashed on completion. The external timber-work was to be of oak, and the roofs covered with thick brown tiles. The estimated cost of the house by itself was 2,500*l.*, and with the addition of stabling, porter's-lodge, gardens, and terraces, 3,700*l.* On account of the rise in the ground to the back of the house, the billiard-room is four ft. above the level of the ground floor. The kitchen and offices are placed under the dining and reception-rooms.

A. N. PRENTICE.



Medallions from Stained Glass Windows, "One Ash," Loughborough.



Window, "One Ash," Loughborough.

#### HOUSE AT BECKENHAM AND HOUSE NEAR ST. ALBANS.

WE may take these two houses together, as they are designed by the same architect. The house "near St. Albans" is at London Colney, and has been built, at a cost of 2,400*l.*, of red brick and half-timber work.

That at Beckenham, not yet commenced, is also to be carried out in red brick, and with red tiling for the roofs.

We append a plan of the London Colney house; that of the Beckenham house will be



House, near St. Albans.—Plan.

found on the lithograph. The architect of both is Mr. Allan F. Vigers.

#### Books.

*Early London Theatres (in the Fields).* By T. FAIRMAN ORDISH, F.S.A. London: Elliot Stock. 1894.

**T**HOUGH the author deals for the most part with matters that lie outside our province, his book, which should take a high rank of its kind, contains many out-of-the-way things that our readers will find very interesting. Take, for example, the structure and arrangements of the sixteenth-century theatres. The Theatre, the first erected in London, was built over Holywell Priory site, Shoreditch, of wood, in 1576, for James Burbage. Circular on plan, and fitted with scaffolding or benches about the arena, it stood open to the weather. They put a movable platform for the players, who entered, from behind the arras, into the arena when the latter was not wanted for displays of rope-dancing, vaulting, tumbling, &c., or exhibition of skill at sword-play or with quarter-staff. The Curtain, not far distant, seems to have been built of the same materials and after the same fashion, since it was called a cock-pit and the "wooden O." The "groundlings," who had no seats, paid 1*d.* each; occupants of the galleries and rooms or boxes paid higher prices. Those seats, and their names, are taken from the inn-yard interiors. The Curtain remained, it is believed, until the general suppression of play-houses in 1642-7, outliving its neighbour, the

Theatre, whose materials were removed in the winter 1598-9 by Peter Street, carpenter, and his men, to Bankside, where they were put together for the famous Globe, destroyed by fire in 1613. The Bankside bear-gardens or amphitheatres are to be seen, not very clearly, in reduced copies, bound in this book, of Aggas's map, the plan done by Hoefnagel for Braun and Hogenburgh's work (1572), and Norden's map (1593). Norden entitles them "The Beare-howse" and "The play-howse" (the Rose); the former does not stand for the Hope, which was not built until 1613, in which year Gilbert Katherens and John Browne, of St. Saviour's, bricklayer, covenanted to make

one game place or plaie-house, a bull-house, and a stable neere or upon the place whereon the game place of the beare-garden now or latlie stood.

The Hope, erected for Henslowe and Meade, is familiar to us as one of the two octagonal houses—the other is The Swan, built in Old Paris Garden for Langley not before 1594—of Visscher's riverside view, 1616. The contract twice stipulates that The Hope shall be like The Swan "in all things." We abbreviate some of its particulars:—

Two staircases without and adjoining play-house. Heavens (our modern "flies") to have no supports on the stage: gutters of lead for same. Two boxes in lowermost storey, "fit and decent for gentlemen to sit in": partitions between "rooms." Turned columns upon and over stage. Principals and forefront of oak: no fir in lowermost or under stories, except uprights at back: all binding-joists of oak. Inner principal posts of first story 12 ft. high, 10 in. square, of middle story 8 in. square, of upper story 7 in. square. Other posts 8, 7, and 6 in. square,



according to story. Bressumers in lowermost story 9 by 7 in., in middle story 8 by 6 in. Brick foundation to rise at least 12 in. above ground. "A louver or storie over the said house." To new tile all upper roof. Browne to lay brickwork for 807. Katherens to supply all materials. Bull-house for six bulls and three horses.

A curious view of the Swan's interior was found a few years ago at the Utrecht University Library in a MS. album or "Stammbuch" of Arend van Buchell. The album contains a short description, in Latin, of the Rose, the Swan, and two other theatres, and a bear-garden, with a sketch of the Swan, "Ex observationibus Londinensibus Johannis de Witt." It is not clear that de Witt, who is supposed to have visited London in 1596, supplied materials for the account and sketch, or for either. The sketch shows the "tectum" with a small attic and its flag above, the "porticus" (second floor), "sedilia" (first floor), and "orchestra" with "ingressus" (ground floor). The "proscenium" stands on the "planities sive arena;" at its upper end, between two columns, is the "mimorum aedēs," its lower portion having two doors opening on to the stage, and its upper portion a gallery in which the players are seated. Other actors are performing; no audience or band is depicted. The "aēdes" has a lean-to tiled roof reaching to the base of the attic, and projecting over the back part of the stage. We have not space enough to render adequate justice to Mr. Ordish's able work, which is confined to the theatres in the Fields; the rest will form the subject of a second volume. The book is well indexed and illustrated with plans, maps, and views. For a portion of the chapter "Before the playhouses," he acknowledges his indebtedness to Mr. Brewer's article and view, "London in the time of Henry VIII.," in our columns (the *Builder*, Jan. 7, 1888).

*The Changes in London Building Law.* By H. HEATHCOTE STATHAM. London: E. & F. N. Spon. 1894.

THIS is the critical analysis of the new London Building Act previously referred to in our "Notes," and based on the articles which have appeared in this journal, with a good deal of additional matter and revision. Among the new matter is included some diagrams of sections of houses, showing the working of the "horizontal line" and "diagonal line," in controlling the height of buildings in reference to the open spaces adjoining them, and a synopsis of the thicknesses of walls of different heights, reduced to the form of a schedule, which forms an appendix to the book. In a second appendix the list of District Surveyors' fees is reprinted from the Act.

The book deals mainly with the changes which will be introduced by the operation of the new Act, including also some criticisms as to its architectural and practical effect in the future.

*Crux Mundi, Cruces Christi, Nomen Domini.* By JAS. HOUGHTON SPENCER. London: Jas. Nisbet & Co.

THIS is a pamphlet of about fifty pages containing the views of the author (whose letters on various questions of symbolism have occasionally appeared in our columns) in regard to the origin and meaning of the T and cross-forms. Mr. Spencer has collected a great deal of curious information on these subjects, and there is much that is interesting in his small book, a good deal of which, however, is rather beyond our limits of discussion. We recommend the book, however, to the attention of those who are specially interested in the history of Christian symbolism.

*The Direct Calculator.* By M. B. COTSWORTH. London: Crosby Lockwood & Co.

THIS is a large-page volume of very conveniently arranged tables for ascertaining at a glance the values for all weights from 7 lbs. to 1,000 tons, at all rates from 1d. up to 100s. per ton. For those who have to make frequent computations of freight-rates, &c., it must prove very useful, and save much time and trouble.

#### TRADE NOTICES.

MESSRS. EASTON & BESSEMER send us their illustrated catalogue of steam-engines and boilers, wood-working and grinding machinery, and pumps, &c. Among the engines is a high-speed electric-light engine, very accurately balanced with the object of being perfectly smooth and silent; they are also made very compact with a view to use on ships. Among the wood-working machines illustrated is an improved circular-saw bench of very massive construction, and specially

designed to be suitable for export. The Rising Spindle circular-saw benches, large and small band-saw machines, planing and jointing machines and moulding and shaping machines, are also illustrated in the catalogue. From Messrs. E. & E. Taylor we have received an illustrated catalogue of their various forms of lifts worked by hand, steam, and hydraulic power, as well as an electric goods lift, available where an electric installation exists in a building. The catalogue also includes iron-roof principals, galvanised iron buildings, iron grilles, revolving shutters, &c. Messrs. E. C. & J. Key, of Birmingham, send us sheets showing their iron roof trusses, sections of floors and footways of bridges (road and rail), and illustrations of iron churches, pavilions, storehouses, rick-covers, and other constructions in great variety, including a good many iron structures for agricultural purposes. We have received from Messrs. Carrick & Ritchie, hydraulic engineers, Edinburgh, their illustrated catalogue of improved turbines and other water motors. Besides giving particulars of the various machines the firm construct, the catalogue contains much useful information on the use and efficiency of turbines, and shows how they can be adopted both for large and small powers. The Water Carriage Engineering Co. (Sheffield) send us their illustrated catalogue of sanitary appliances, including among other things illustrations of their patent automatic flush tank, which appears to have obtained a very satisfactory record in the Sheffield Corporation Report on Automatic Flushing Closets.

### Correspondence.

To the Editor of THE BUILDER.

#### VENTILATION.

SIR,—In the Editorial Notes last week a desire was expressed to hear more of this subject from both sides; permit me then to clear the way with a few observations on the necessity for first arriving at an understanding as to the employment of terms in connexion therewith; because, until uniformity and care are exercised in their use, no discussion can be systematically or advantageously carried on, and the chance of treating the subject from a purely scientific point of view will be indefinitely deferred. For instance, at the close of the Notes above referred to, mention is made of "Mr. Henman's system," now, I have no system—in fact there are but two systems of ventilation, viz.: that of "Extraction" and that of "Propulsion," and they are the property of all; but there are many different methods of applying or employing those systems. It would, however, have been incorrect to have spoken of "Mr. Henman's methods" as being employed at the New General Hospital, Birmingham, because they are those of Mr. William Key, C.E., of Glasgow.

Although I have never failed in expressing my obligations to Mr. Key for having given me an insight into the practical application of mechanical means by which continuously good ventilation may be secured, I have, in public discussion, the subject, avoided giving too great prominence to his name, for fear of further arousing trade jealousies. Yet I do not now hesitate to say that no one, however experienced he may be in the theory, or even in the practice, of ventilation, can have any proper appreciation of the practical application of mechanical means for that purpose until he has, without prejudice, thoroughly examined and grasped what Mr. Key has accomplished by the means he employs, which during the last five or six years have given great satisfaction in providing continuously reliable ventilation in hospitals, technical and Board schools, churches, public halls, manufactories, and private dwellings.

In the face of such success his methods can scarcely be termed new-fangled, and it is to be regretted that those who venture to express opinions

• Mr. Henman is perhaps right there: the use of the word "system" in that particular sentence was merely a slip in expression at the moment of writing; but he is hardly in a position to correct us as to the use of words, since he uses the term "natural ventilation" throughout his own letter, after specially saying that the expressions "natural" and "artificial" ought to be abandoned. That statement itself, however, is an absurdity. Natural and artificial ventilation are perfectly distinct things. There are, in fact, three distinct systems of ventilation, which may be defined by the words "natural," "artificial," and "mechanical." Natural ventilation is simply opening windows and letting the air move freely about as it will. "Artificial ventilation" is inducing the movement of air by such means as a specially-contrived extract-shaft, with heat applied at the foot of it, to produce a special movement of air, such as it would not take if left to itself. "Mechanical ventilation" is when movement is imparted to the air by mechanical impact, such as is produced by the blades of a fan, or by any other propelling surface (an Indian punkah, for instance, is mechanical ventilation, though it is generally worked by manual power). We have had occasion to fully consider the point, and to that division and nomenclature we intend to adhere.—E.C.

upon ventilation by mechanical means should so persistently "hark back" to the reports on the attempts made some twenty to thirty years since, and shut their eyes to what has more recently been accomplished with fuller knowledge and better appliances.

If this subject is worthy consideration from a scientific point of view, the terms "natural" and "artificial" ventilation should be absolutely excluded.

Ventilation is ventilation, by whatever means it is secured; the employment of such misleading adjectives undoubtedly prejudices the minds of those who only superficially examine the subject.

Let it be clearly understood there is no such thing as a natural system of ventilation, or of an artificial system of ventilation.

Natural means are movement in the outer atmosphere—or, in a word, wind—employed so as to cause change of air within an apartment, either by propelling it in or extracting it therefrom through suitable openings; and mechanical means or heat are made use of because the natural force of wind is so variable, and cannot be relied on to provide continuously good ventilation: even open fires cannot properly be considered as natural means, as thereby a power of extraction is exercised up the smoke-flues.

In addition to using only exact terms, it is necessary to arrive at a correct definition of ventilation. That given by Mr. Keith Young in his paper on "The Sanitation of Hospitals"—viz., "ventilation means the supply of fresh air, warmed to the requisite temperature, and in sufficient volume to preserve a given standard of purity without producing draughts," is inadequate, because it does not specify the standard of purity, or even refer to the important question of humidity, and misleading, because it is unnecessary to warm air on a hot summer's day, and because if, as is often the case, an apartment which is unoccupied has to be ventilated, draughts need not be avoided.

A more comprehensive and correct definition is, the supply of fresh, pure air, of suitable temperature and humidity, continuously introduced so as to prevent stagnation in any portion of an apartment, and so as to displace air which has in any way become vitiated, in a manner to give the greatest comfort to occupants should any be present.

Mr. Young further puts the question, "Is there any evidence to prove that wards cannot be kept clean and healthy without recourse to expensive automatic appliances?" to which he only gives his opinion in the negative, and—a *tu quoque* answer, I, however, would reply that there is abundant evidence to prove that wards are not continuously kept in a sweet and healthy condition when natural means are relied on, or why is there such a continued cry for better ventilation? Neither can it be admitted that appliances must necessarily be expensive.

Expensiveness is a question of degree, and if it is shown that natural forces are unreliable or inadequate, other power must be employed; for example, wind and water-power have had to give place to steam for grinding corn, and the scientific collection, storage, purification, and distribution of water have in many instances superseded wells. The necessities of large communities demand such changes, and if, as there is reason to believe, natural means cannot be relied on for ventilation in our large cities and towns, is it unreasonable to suppose that mechanical power cannot be applied with advantage to it, as it has been to other human necessities?

Let us examine the question in detail, and, for the purpose, take an ordinary hospital ward, because, when occupied throughout both day and night, the necessity for good and continuous ventilation is most important. Say it is for twenty-four beds, situated in the centre of a large manufacturing town; ventilated by natural means and heated by open fire-places, assisted by steam or hot-water pipes with ward conveniences, &c., attached, all fitted with the most modern sanitary appliances; windows to open, and holes through the walls, termed ventilating openings—by which, let it be presumed, a sufficiency of air can be admitted and discharged under favourable circumstances: i.e., when the windows, &c., can be freely opened on a mild spring or autumn day with a fresh breeze blowing—change of air is then principally brought about by the propelling power of the wind outside. (Propulsion.)

To change the air four times per hour will require more than a quarter of a million cubic feet every twenty-four hours. Consider the amount of dust, dirt, smuts, flies and other insects which will enter therewith. (Impurity.)

Now take a hot, muggy day in summer. Windows open as before, but there is no propelling power of wind to cause the necessary change, and as fires are not lighted, no power of suction is available, and what little air enters is surcharged with heat and moisture. (Stagnation.)

Next a frosty day in winter with fires burning. It is too cold for open windows, so they and other openings to the outer air are closed. Yet air must enter to replace that which is sucked up the flues by the burning fires. (Extraction.) Who can tell whether it comes or what its standard of purity? Feel it one decidedly can, for it is being drawn in at every crevice with great velocity directed to the fires, yet causing little change of air in the distant



parts of the ward. Maybe it comes in from the corridors or from other wards, perchance from the ward conveniences, and certainly, if direct from the outside, it is dry and cold, and consequently hurtful to delicate patients. (Draughts and inadequate change.)

At night all these disadvantages are aggravated. This is no exaggerated statement, and yet, although no deaths are actually registered as being due to defective ventilation, it is not more than probable that much discomfort and perhaps some deaths are due thereto?

Turn from this to what is accomplished by mechanical means, viz., in spring, summer, autumn, and winter, both day and night, a continuous change of air throughout the ward, from eight to ten times every hour, without the slightest draught, the incoming air of suitable temperature and humidity, freed from dust, dirt, smuts, flies, and other impurities. (Good ventilation.)

In this there is no exaggeration either—it is being done, and yet not one of those who supported Mr. Young's advocacy of what he calls "natural ventilation" has taken the trouble personally to ascertain that it is a fact and can be verified.

Even if they admit the possibility of such practical perfection, they say, "Look at the cost!" Well, the first cost is somewhat more than simply trusting to chance; but in addition to securing what is required, there is, at least throughout the winter months, considerable saving in fuel. No coal has to be carried about the buildings. The heating and ventilation go on without disturbance to patients; no fires have to be made up in the wards, or windows opened and closed. Repairs to apparatus are considerably reduced, because no heating appliances are in any habitable portion of the buildings; cleanliness is preserved with far less labour; and, above all, no air from an impure source can find admission, because the pressure is always in an outward direction.

Now that gas-engines and electric-motors can be economically employed, and rotary fans are brought to a high state of perfection, large volumes of air can be propelled at a moderate cost, and by means of Mr. Key's moistened screens air can with ease be cleaned and brought to a proper state of humidity; such being the case, and it being realised that the air-ducts and flues should be of large size and arranged so that they may be easily and periodically cleaned, the difficulties which beset the pioneers of ventilation by mechanical means are practically overcome, and success is now attainable. Many details there undoubtedly are which require special study and careful adjustments, but when once an installation is properly set working, so long as it is suitably maintained, there is no reason why it should not continuously do duty economically and with comparatively little attention.

Another question relating to cost I have raised which is worthy of consideration. If the air of a ward can be so continuously and frequently changed, where is the necessity for so much cubic space per patient?

The demand for cubical capacity in hospital wards has undoubtedly been made in consequence of the difficulty in securing a suitable standard of purity by natural means; but if frequent change of air is obtained by mechanical appliances, there can be no necessity for greater size than is required for nursing purposes.

I venture to say that any additional cost in setting up a serviceable heating and ventilating installation could be more than balanced by reducing the size of buildings, together with greater efficiency and lower working expenses.

If some of your numerous readers will take this subject up and continue the discussion from a practically scientific standpoint, popular prejudices may be dispelled, and even further advance may be made in the employment of mechanical means for securing good ventilation.

WILLIAM HENMAN, A.R.I.B.A.  
Birmingham, Dec. 5, 1894.

P.S.—There has recently been some correspondence in the *Builder* respecting the deterioration of pictures in the National Gallery, attributed to the drying of air by hot-water pipes, or, in other words, the want of a system of heating and ventilation such as will secure a suitable temperature and humidity in the air supply to the galleries. If there is to be any modification of the existing appliances, the authorities would do well to make themselves acquainted with Mr. Key's method of maintaining air at a proper state of humidity in connexion with a system of heating and ventilation.

W. H.  
\* \* We shall be glad to find space for any letters on the subject from those who have anything important to say, with the reservation that we cannot print letters from those who are commercially interested in any particular method of ventilating.—Ed.

#### TEWKESBURY ABBEY.

SIR,—In your issue of this week *re* above, you say (on the authority of the Rev. T. H. Blunt), the church was consecrated and dedicated to the Virgin on November 20, 1123, having been completed by Earl Robert, brother of Henry I.

Duke Robert was brother to Henry, and died in

Cardiff Castle, 1135, after an imprisonment there of twenty-nine years. Does your authority mean Earl Robert of Gloucester, the natural son of Henry I?

J. A. BREWLEY.  
\* \* We find our correspondent is correct, and we were misled by what is evidently a mistake in Blunt's book.—Ed.

SIR,—I am sorry to miss, from your notice of Tewkesbury Abbey, any reference to the rich centre bosses of the groining of the nave. They make the Virgin strangely prominent, if my memory is right in telling me that she is represented as present at the Last Supper and chief among the group at the Descent of the Holy Spirit. I do not know whether they are in this respect unique.

R. T.

#### STAINED GLASS.

SIR,—Might I beg the courtesy of your columns to warn your readers? I find that glass which is not mine is being sold by lead-light makers as "Prior's glass." May I add that my only makers are Messrs. Britten & Gilson?

EDWARD S. PRIOR.  
\* \* The glass referred to is that which we described in a "Note" on page 388, *ante*, in reference to a window designed by Miss. Lowndes, and exhibited at Messrs. Britten & Gilson's.—Ed.

#### BALL-ROOM FLOORS.

SIR,—Such springiness as is necessary must be got from the elasticity of the floor-boards, and not from that of the joists and girders beneath them, which should be rigid.

An inch yellow batten under floor, with an inch pitch-pine floor (in four-inch widths, edge-nailed and doweled) laid upon it, works very well.

A ball-room floor hung in chains exists, I believe, in Mrs. Grove's well-known villa at Hampton-on-Thames, "Garrick's Villa." I believe it is very amply tested at regatta times, but have never heard that it was very elastic. I do not see that the chains would make it so unless they were attached to G-springs.

L. C. R.  
J.S.—I have heard that the floor-boards in a ball-room should run lengthways, but I believe this to be a "fad."

#### IRON WATER-TANKS.

SIR,—Would any of your readers kindly inform me what is the best thing to coat the inside of a large cast-iron water-tank?—or should it be left as it is?

CLERK OF WORKS.  
\* \* We presume our correspondent means galvanised iron.—Ed.

### The Student's Column.

#### DETAILS OF RURAL WATER SUPPLY.—XXIII.

##### SPECIFICATIONS AND ESTIMATES.

THE preparation of the drawings, specifications and general conditions of an intended work should receive the greatest care and attention, the descriptions being in detail and clearly expressed, otherwise the contractor will construe them in one way and the engineer in another. It is therefore in the interests of both parties to the contract that sufficient time and care should be taken in drawing up the clauses and in giving as much information as possible to the contractor. This will avoid disputes during the progress of the work, which usually result in claims for extra payments over and above the contract amount. The bill of quantities showing the amount of work to be performed under each item of the specification is either prepared by the engineer or by a quantity surveyor, for which it is customary to allow from  $\frac{1}{2}$  to 1 per cent. on the amount of the accepted tender. This is charged through the bill of quantities, and repaid or transferred to the engineer or quantity surveyor by the contractor. It is not a desirable arrangement for the engineer to have any monetary transactions with the contractor, and it would undoubtedly be an advantage where the quantities are taken out by the engineer for this payment to be made direct to him by the person or persons for whom the work is being performed.

The following specification for cast-iron pipes will act as a guide to the preparation of contracts for such works, at the same time giving an insight into the style and method usually adopted in the preparation of specifications generally. The general conditions in this case are embodied in the specification, and are not kept distinct, as is usual in large contracts for engineering works.

#### RURAL SANITARY DISTRICT OF

##### Cast-iron Pipes, Irregulars, and Special Castings.

SPECIFICATION to be observed by the contractor for the supply of ordinary iron pipes, irregular iron pipes, and special castings, to the

Waterworks Department of the Local Authority of the Rural Sanitary District of—

(1.) The cast-iron pipes, from 3 in. to 12 in. in diameter, are to be in 9-ft. lengths, and the 2-in. pipes are to be in 6-ft. lengths, in each case exclusive of the socket. The whole or any portion of the above sizes to be spigot and socket, or half-turned and bored joints as may be directed to be supplied, and to be of the following weights except when otherwise ordered.

Diameter in ins.	Length of pipe in ft.	Weight including socket.				Diameter in ins.	Length of pipe in ft.	Weight including socket.			
		in.	lb.	cwt.	qrs.			in.	lb.	cwt.	qrs.
2	6	0	1	1	1	8	9	3	2	10	6
3	0	1	0	7	7	9	0	4	2	10	6
4	0	1	1	1	1	10	0	5	0	3	3
5	0	2	1	2	11	11	0	6	2	1	1
6	0	3	1	1	11	12	0	7	6	2	2
7	9	3	0	15	15	13	0	8	10	2	10

(2.) Any pipes which deviate more than 3 per cent. from the stipulated weights will be rejected. The whole of the pipes are to be manufactured and afterwards tested by hydrostatic pressure, by and at the expense of the contractor. The test pressure to be equal to a column of water 600 ft. high, and such pressure shall be maintained in each pipe at least two minutes, previous to which the connexion between the pump and the testing-machine is to be cut off. Each pipe, while under this pressure, shall be rapped from end to end with a hand-hammer 4 lbs. in weight, so as to discover any sandy, porous, or blown places. The pipes will be again proved by and at the expense of the Authority, after they have been delivered at the place required. Any pipe which shall be found to be imperfectly coated, or in which any imperfections shall appear, or wherein any sand or air-holes shall appear to have been plugged up, or which shall not agree with the terms of the specification, will be rejected.

(3.) The irregular pipes and special castings are to include all branches, elbows, thimbles, clips, cant socket-pieces, hydrant, valve, metre, and stop-tap covers fitted as per pattern, also all flange and other special castings, samples of which may be seen on application at the water-works offices.

(4.) The straight pipes are to be cast in dry sand moulds vertically, with the sockets downwards, and the curved pipes in loam or dry sand in close boxes; the castings are to be made without the use of core-nails, chaplets, or thickness pieces, or any substitute for the same, and the contractor is to provide turned iron patterns, boxes, core-bars, and barrels for making all straight pipes, the flanges, spindles, sole plates, and cores of which are to be accurately turned, faced, bored, truly fitted and joined. The sand must be sufficiently fine and fresh to produce a smooth and perfect surface, and all the moulds and cores are to be properly lace-washed and carefully dried. Great care is to be taken in preparing and drying the cores in order to ensure a smooth surface to the pipes internally.

(5.) All pipes of 5 in. diameter and under will be allowed to be cast at an angle of not less than 45 deg. from the horizontal. The pipes of each size respectively are to be of uniform bore and thickness of metal throughout their respective length, and without any belts. The castings are to be free from scoria, sand-holes, air-bubbles, cold-shuts, laps, washers, and all other imperfections; and the pipes are to be truly cylindrical in the bore, straight in the axis, smooth within and without, and internally of the full specified diameters, and they shall have their inner and outer surfaces as nearly as possible concentric. An increased length of at least 6 in. is to be cast on the spigot end of each pipe, such increased length being afterwards cut off in a lathe to the specified size. All pipes are to be perfectly dressed and cleansed, so that no lumps or rough places are left in the barrels or sockets. The contractor will be charged with and must pay and defray any and all losses, charges, and expenses to or for which the Local Authority or their Committee may be put, or be liable by reason of any neglect with respect to the forms and sizes of the sockets and spigots. And for the better prevention of chills, uneven shrinkage, and cracks consequent thereon, the contractor must undertake that the pipes shall not be removed too hastily from the moulds, or be laid while hot upon cold or damp earth, or be exposed while in a heated state to wet or inclement weather.

(6.) Special precautions are to be taken in







Board school accommodation. These works are being supplemented by a remarkable amount of private enterprise.

**JOHN KNOX PRESBYTERIAN CHURCH, NEWCASTLE.**—On the 28th ult., the foundation-stone was laid of the new John Knox Presbyterian Church, Elswick-road, Newcastle. The plan of the new church is of a horse-shoe shape. The congregation enter through a covered porch, an enclosed vestibule into a corridor leading right and left round the curved end and the sides of the church. From this corridor there are six doors leading to the aisles, communicating direct with the seating. Above the surrounding corridor, and projecting a very little way over the ground-floor seating, is designed the gallery. The floor slopes gently towards the pulpit. The staircases to the gallery go right and left from the main entrance vestibule, and ladies' and gentlemen's cloakrooms are also provided at each side of the vestibule. Behind the pulpit is a recess for the organ, with a similar recess at the opposite end. The church is roofed in one span of 58 ft. In close proximity are designed the minister's vestry, sessions vestry, assembly hall, 58 ft. by 39 ft., with a gallery at one end, and six class-rooms divided by movable partitions. On the upper floor is a second hall, 38 ft. by 17 ft., and on the ground-floor a third room, 58 ft. by 17 ft., a ladies' sewing-room, tea kitchen, and, underneath the large hall, owing to the steep fall of the ground, there is designed a gymnasium. A caretaker's house is also provided. A separate entrance is arranged to all these rooms from Elswick-road and Beech Grove, with interior communication throughout. A square tower is situated at the main corner, next Elswick's railway, to a height of 70 ft. The building is constructed of stone from the Prudham quarries. The interior will be finished in plaster, with ornamental pilasters, cornices, and coved ceiling. The woodwork will be yellow pine. The building is ventilated by mechanical means. It is intended to illuminate the church by the electric light. The amount of the contract for the several buildings is about 8,000l. The portion of the work already executed, comprising the halls, class-rooms, vestries, &c., has been erected by Mr. G. H. Mauchlin, contractor, Newcastle; and the church, cloak-rooms, and tower are now being built by Mr. Alexander Pringle, contractor, Gateshead. The clerk of the works is Mr. Nicholson, and the whole of the buildings have been designed by Mr. W. Lister Newcombe, architect, of Pilgrim-street, Newcastle.

**PROPOSED SHELTER FOR LEITH CASUAL DOCK LABOURERS.**—Plans have been prepared by Mr. Peter Whyte, superintendent to the Leith Dock Commission, for the erection of the proposed casual dock labourers' shelter at Constitution-place, Leith, and for the erection of offices for the use of the company porters and stevedores in connexion therewith, and it is expected that the work will be proceeded with shortly. The offices and shelter are being erected with the object of concentrating the dock labour of the port in one locality.

**LYCH GATE, BISHOP'S CASTLE, SALOP.**—A lych gate in Early English style was recently dedicated at Bishop's Castle. The architect was Mr. Lloyd Oswal, of Shrewsbury, and the contractor Mr. R. Bridgeman, of Lichfield. The structure, the wooden portion of which is composed of oak wood, carved with oak foliage, grapes, and emblems, is laid on moulded pilasters of red Runcom stone.

**MEMORIAL HALL, SOUTH QUEENSFERRY.**—On the 30th ult., in the burgh of South Queensferry, Lord Rosebery handed over to the Town Council a permanent memorial to his late wife in the form of a hall for the use of the inhabitants of the burgh. The exterior architectural treatment of the building is of the seventeenth-century Scottish style. The entrance-porch is semi-circular, and is decorated with rectangular pilasters. Entering by the front lobby, the first door to the right is the Council Chamber, which has been renovated, and incorporated in the new building. Rooms for reading, and for dominoes, chess, &c., are provided, and opposite is the entrance to the library, where the books are given out for use. The hall proper is capable of seating four or five hundred persons. At one end is a stage, painted and decorated in terra-cotta colour. Adjoining, and on the stage-level, are two ante-rooms, connected by a passage, and communicating with the outside. At the other end of the hall there is a small gallery, capable of seating about fifty persons. The ceiling is formed of three elliptical arches, supported by pilasters. On a level with the entrance to the gallery of the hall is a billiard-room, with card-room adjoining. The caretaker's rooms, cloak-rooms, lavatories, and besting-chamber are situated on the ground-floor. The architects of the hall were Messrs. Sydney, Mitchell, & Wilson, Edinburgh, and the work has been carried through under the superintendence of Mr. William Campbell, Lord Rosebery's clerk of works.

**WORKSHOPS, ACKWORTH SCHOOL, NEAR PONTEFRAC, YORKS.**—To meet modern requirements in the way of technical instruction new workshops have recently been added to the block of buildings known as the Society of Friends' School at Ackworth. The school was founded in 1778 by Dr. Fothergill, a well-known London physician, who, with other members of the Society of Friends,

purchased the estate and the buildings, which had been erected in 1759 to serve the purpose of a founding hospital. As a hospital, the career of the institution was short-lived, and upon the withdrawal of the Government grant in 1773 it had to be closed. The plan of the school consisted of a centre and two wings, connected by means of quadrantal colonnades. It is said that the central block was planned by the Rev. Timothy Lee, D.D., Vicar of Ackworth, who had Sir Rowland Winn as his colleague, but it is evident from the detail of the building that assistance must have been given by an architect conversant with the characteristics of English architecture. John Smee, the celebrated engineer of the Eddystone lighthouse, is credited with the original arrangements for the water supply. In designing the new annex for technical purposes, care has been taken that it should harmonise as far as possible with the old Georgian buildings. It is a one-storied building, 60 ft. long by 30 ft. wide, one half of it arranged as a class-room with working-bench space for twenty students, and the remaining half fitted up with benches and lathes for leisure hour pursuits. A short corridor connects this latter room with the gymnasium. In height the rooms are 13 ft. 6 in. to the plate, and 16 ft. 6 in. to the ceiling. The walls are faced with stone from the Ackworth Moor Top quarries, and lined inside with brick, and the roof is covered with greenish Tisbury white slates. The floors are laid with substantial floor-boards on a concrete bed. In addition to the window-lighting, additional illumination is provided by means of north roof lights. The rooms are heated by low-pressure hot-water piping. The new extension, which was opened on the 22nd ult. by Mr. Thomas Humphrey, of Newcastle, the Chairman of the School Building Committee, has been erected by Mr. John Simpson, of Ackworth, from the designs and under the superintendence of Mr. William H. Thorp, architect, of Leeds.

**HOUSE, CUMBERLAND AND WESTMORELAND ASYLUM.**—A house for private patients is about to be commenced at Garlands, Carlisle. This is part of a scheme for providing accommodation for paying-patients, consisting of a central main administrative building and a series of houses on either side. An excellent site has been chosen in the asylum grounds. The designs are being prepared by the County Architect, Mr. Geo. Dale Oliver, of Carlisle.

**NEW SCHOOLS, WIGAN.**—On the 28th ult., the new Church Schools, which have been built in the parish of St. Andrews, Wigan, were opened. The schools have accommodation for about 500. The work has been carried out by Mr. C. B. Holmes, of Wigan, at a cost of about 2,800l. The architects are Messrs. Heaton & Ralph, Wigan.

#### SANITARY AND ENGINEERING NEWS.

**BRIDGE, BROOMHILL, N.B.**—On the 27th ult., the Broomhill Bridge, which has been in course of erection for about a year, was opened by the Countess of Seafield. The new bridge is to take the place of the old one, which has been considered unsafe. It is one of the longest on the Spey, having a length of 450 ft. It consists of fifteen spans, varying in width from 25 to 33 ft. each. Piles have been driven about 20 ft. into the bed of the river, and the bridge itself is built of cross-bedded red wood with double cantilevers, and has ornamental stone towers at each end. It has a clear width of 14 ft. between the parapets, and has cost about 1,700l. The contractor was Mr. Charles Mackay, Inverness, and the architect Mr. Mackenzie, road surveyor, Kingussie.

#### STAINED GLASS AND DECORATION.

**WINDOW, JESUS COLLEGE, CAMBRIDGE.**—A painted window has been placed in Jesus College, chapel, Cambridge, in memory of the Rev. G. S. O. Morris, formerly scholar of the college. The window is one of three lights, on which are represented figures of our Lord and the Apostles St. Peter and St. Paul. The principal portion of the colour is found in the draperies of the figures, the accessory ornament being painted on white. The style chosen is that of the earlier years of the sixteenth century. In the interstices at the top of the window are scrolls bearing the words "Fides," "Victori," "Spes," with emblems. The window was designed and drawn by Mr. N. H. Westlake, F.S.A., and executed by Messrs. Lavers & Westlake (London).

**SCULPTURED PANELS, BLACKBURN FREE LIBRARY.**—A sculptured panel on the north-western facade of the Blackburn Free Library and Art Gallery was recently unveiled, the work having been carried out by Mr. G. W. Seale, sculptor, of 234, Coldharbour-lane, Brixton. The sculptor has followed the same idea as that expressed in the central panel over the entrance in the arrangement of the figures, but the new work is illustrative of modern times instead of ancient history and philosophy. Nine figures are grouped upon the panel in the following order:—Macaulay (history), Thackeray (fiction), Dickens (fiction), Browning (poetry), Ruskin (poetry), Darwin (science), Symbolical objects are carved in relief, the Temple of the Muse forming the background of the poets, and other symbols are introduced to give expression to the

different characters. This is the eighth panel upon the building, and the work was begun by the sculptor in 1874.

**MEMORIAL-TABLET, EVETER CATHEDRAL.**—A tablet has been erected in the south aisle of Eveter Cathedral in memory of the late Major-General Fremantle. The tablet is of white statuary marble, and is the work of Messrs. Harry Hems & Sons, Exeter.

**WINDOWS, ST. PATRICK'S CATHEDRAL, ARMAGH.**—Two stained-glass windows have just been completed in St. Patrick's Cathedral, Armagh. The windows occupy a position on the west side of the sanctuary, above the Lady's Chapel. Each of the windows consists of three lights, surmounted with trefoiled tracery. In the first window are the figures of St. Joseph, St. Malachy, and St. Benignus, and underneath these is a representation of the parable of the Good Samaritan. On the second window is given a representation of the three saints, St. Theresa, St. Brigid, and St. Dymphna. The windows are from the studios of Messrs. Mayer & Co.

#### FOREIGN AND COLONIAL.

**FRANCE.**—The distribution of awards in the competition for the design of the new Société Nationale des Architectes Français took place last week; the first prize was awarded to M. Ferdinand Perrin, the second to M. Fernand Lorraine. The Municipal Council at Paris has voted a credit of 283,000 fr. for the continuation of the works of the new Mairie of the Xth Arrondissement, in regard to which a report has been submitted, giving the highest credit to the architect, M. Rouyer, for the design of the building, which it is considered will be a great addition to Parisian architecture. A monument to Léon Cladel, the author, has been commissioned from M. Auguste Rodin, to be erected in Père la Chaise. The same sculptor is to carry out the monument which the Municipality of Calais intend to erect to the memory of the "Bourgeois de Calais." The monument will be erected on the "Place des Postes," and is expected to be inaugurated in June next. It is announced that the celebrated ruins of the Abbey of Jumièges are to be sold. It is to be regretted that the State should not think it worth while to acquire the remains of this Abbey, so rich in historic associations, and the preservation of which would be a matter of real interest to artists and archaeologists. The new ceiling decoration of the Théâtre de Moulins, a painting by M. Auguste Sauroy, has just been inaugurated. The subject is the apotheosis of Théodore de Banville, whose principal works are symbolised by the personages grouped around the bust of the poet, while a figure representing his native town crowns him with laurels. It is announced that a local narrow gauge railway is to be shortly established in the departments of Oise and Somme, between Bussy and Ercheu. In order to satisfy the demand made to it by M. Daumet, in the name of the Société Centrale des Architectes, the President of the Tribunal de Commerce of the Seine has decreed that in future the qualification of architect should not be given to any bankrupt, in a legal declaration of insolvency. This decision is based on the principle that an architect is a member of a liberal and artistic profession, and has nothing to do with commercial speculations, and that therefore *quid* bankrupt, he is not an architect. M. Adolphe Leclerc, the French resident in Cambodia, has discovered at Kampong-Thom the ruins of thirteen brick towers, formerly dedicated to Brahminical divinities, as well as of an elevated road from these towers to Angkor-Thom, the ancient capital of Cambodia.

#### MISCELLANEOUS.

**NEW UNDERGROUND CONVENIENCE IN HIGH-STREET, ISLINGTON.**—The convenience, which is constructed under the carriage-way of High-street, comprises entrance and exit staircases enclosed by wrought-iron railings, six water-closets, twelve urinals, lavatory with three basins, attendant's-room, and two store-rooms. The roof is formed of pavement-lights supported on steel-joints, and is laid out as a refuge. The brickwork has been built in Portland cement. The interior is faced with white-glazed bricks, with a plinth and dado of blue-glazed bricks, the whole being laid with very fine joints. A horizontal damp-course has been laid in all walls at the floor level, the back of the exterior walls has been twice coated with a boiling mixture of tar and pitch, and a backing of dry rubble has been put round the walls and drains formed of leaded-pipes, laid so as to discharge subsoil water through weep-holes in the exterior walls into gullies inside the convenience. The drains are formed of glazed stoneware socketed pipes jointed with cement, and are ventilated into brick chambers in the carriage-way, the chambers also acting as surface-water gullies. Doulton's "Simplicities" water-closets have been used, and are flushed by the "Paisley" system, each of three gallons capacity. The basins are fixed by bolts embedded in concrete, so that a basin can be replaced without disturbing the tiling of the floor, by simply taking off the nuts and placing another basin over the bolts, which remain fixed



permanently in the concrete, and replacing the nuts. Messrs. Charles Smith & Sons' indicator locks have been fixed on the doors of the water-closets. The urinals have semi-circular backs of white glazed ware with screens and backs of Rouge Royal marble. The only special feature in the construction is a movable slab in the back, which makes the pipe to each urinal accessible without the removal of the whole of the marble back. The lavatory is furnished with Doulton's pedestal basins of the tip-up kind. All the frames of the doors and partitions have been set on chamfered bases of York stone 3 in. above the level of the floor, in order to prevent their lower parts being injured by water splashed from the hose. The floors are laid with vitreous tiles. Cast-iron gratings and a central trap-column on the refuge have been provided for the ventilation of the convenience. Gas-jets, fixed over the doors of the water-closets, will light the convenience at night, and the products of combustion will be collected by hoods placed above the jets, and conveyed by tubes discharging under the ventilating gratings on the roof. The drainage throughout has been designed by Mr. J. Patten Barber, M.Inst.C.E., Chief Surveyor to the Vestry, and carried out by Messrs. Doulton & Co., sanitary engineers, London, Paisley, and Paris; the cost amounting to £1,510.

**DISSOLUTION OF PARTNERSHIP.**—We are informed by Messrs. Mainzer & Farrar (late Mainzer & Farrar, 10, Abchurch-lane, London) that their partnership, which was dissolved by mutual consent, Mr. W. Mainzer will continue the mosaic and parquetry department, and Mr. E. Farrar will continue the casement and lead-light department, at 69 Berners-street, W.

**GLASGOW INSTITUTE OF ARCHITECTS AND THE COUNCIL OF THE TOWN OF GLASGOW.**—The Council of Architects have presented a memorial to the Corporation regarding the designing of public buildings in the city. In the memorial it is set forth that in the case of the Municipal Offices in George-square, and that of the Art Galleries in course of erection by the Association for the Promotion of Art and Music in Glasgow, a desire is shown, and some consideration given to secure that the designs should be worthy of the important purpose that each of those buildings was to serve. With buildings of secondary, but still of great importance, no corresponding effort is made. The Council of the Institute submit that the design and arrangement of such buildings are, as much as those of the larger edifices, worthy of every attention and care that can be bestowed on them. The Council of the Institute are of opinion that the designing of important public buildings cannot be satisfactorily done by the department of the Master of Works, or of the City Engineer, and still less when the head of that department is an engineer than when he is an architect. The duties of the office include, among others, the charge of the public streets, and the design and superintendence of numerous and important works of engineering, as well as assisting and advising the committees of the Town Council in connexion with health, gas, water, paving, sewerage, City Improvement Trust, railway and other matters, and many other works, and it is evident that in a city of such magnitude as Glasgow these duties must be of a very onerous nature. To relegate the designing of important works of architecture to the assistants of a gentleman who is responsible for the efficient discharge of such duties as the foregoing, and who is himself not an architect, is to neglect the public interest. It is the opinion of the Council of the Institute that the design of such buildings should occupy an important city, not only within the membership of the Glasgow Institute, but also outside it, among architects of the city and others, there is a large fund of architectural ability and experience. The Council of the Institute respectfully ask the Town Council to consider how far this ability should be made available on behalf of the community under their charge. In conclusion, the Council of the Institute desire to say that they are not impelled by any merely selfish or narrow motive, but that they ask for the consideration of a question of public policy on which they believe themselves to be entitled to express an opinion.

**REFRIGERATOR CHURCH, SOMERSETSHIRE.**—The additions to the reredos in Corfe Church, which have been erected by Mr. F. W. Newton, J.P., D.L., of Barton Grange, to the memory of the late Mrs. Newton, were dedicated on the 30th ult. The additions consist of two wings filling up the spaces between the centre piece and the north and south walls. The centre piece is a fine carving carried out by Mr. W. J. Giles, carver, of Wellington, from the designs of the architect, Mr. J. Houghton Spencer.

**NEWCASTLE SOCIETY OF ANTIQUARIES.**—On the 27th ult. a meeting of the Newcastle Society of Antiquaries was held in the Castle. Dr. Embleton read a paper entitled "Notes on the Quig's Burial-place, Percy-street, Newcastle." He stated that on August 3 he witnessed the excavations going on at the site of the once famous Bruce Academy, in Percy-street, where the burial-ground had been. With respect to the head-stones, some of them had previously been removed from the ground and placed against the walls, and later on they were removed, and some of them deposited in a room means suitable places. One was said to be in the Unitarian Church, New Bridge-street, Newcastle, and another was in the Castle. A piece of marble

engraved with a crest was discovered during the excavation. Mr. Maberly Phillips said he believed that the date of the first interment at the Quig's burial ground was in 1683. The stone in the Unitarian Church had never come from the Quig's burial-ground, and the reader of the paper was in error there. The stone was that of William Durant. It was found in Anderson-place, where Durant was buried, and he believed it was given by the historian Brand to the Rev. Mr. Turner, when the Unitarian chapel was in Hanover-square, and when the community removed to New Bridge-street the stone was taken there. The Rev. Alfred Boot, vicar of St. John's, Darlington, read a paper on "Northern Monasticism." Votes of thanks were recorded to the readers of the papers.

#### LEGAL.

##### WHAT IS A NEW ROAD?

IMPORTANT POINT UNDER THE PUBLIC HEALTH ACT.

THE case of the Bromley Local Board v. Lansbury and another came, on the 4th inst., before a Divisional Court of Queen's Bench, consisting of Justices Grantham and Lawrence, it being the appeal of the Board from the decision of Judge Emden, of the Bromley County Court.

The action was brought by the Board below to enforce the payment of 42l. 10s. 5d. under the Public Health Act, 1875, in respect of two houses in New Homesdale-road, Bromley, upon the estate of Mr. Thomas Lansbury, such amount being an apportionment of the cost of making up the road. It appeared that the Homesdale-road was laid out in 1875, and in 1884, buildings having been erected on both sides of the road, Lansbury, who was one of the frontagers, and the Local Board came to an arrangement that the new road should be made up to the satisfaction of the Board's Surveyor, and should be kept in repair by the frontagers for six months, and that the Board should then adopt the road. The Board, however, did not, after the expiration of the six months, give the notice of adoption under Section 152 of the Act. Subsequently the road falling into disrepair, the Board in 1888 served Lansbury and the other frontagers with a notice, under Section 150 of the Act, to make-up the road. As this notice was not complied with, the Board executed the necessary works, and ultimately commenced the action to recover the expenses. The Board's contention was that the case came within Section 152 of the Act, and therefore it had no power in 1884 to take over the road, because the requirements of that section as to metalling, channelling, sewerage, gravelling, &c., had not been complied with.

The defendants contended that the case came within Section 145 of the Act, which gives the Local Authority power to agree to the making of a new road without requiring any of the particular things specified in Section 150 to be done. The learned County Court Judge held that the Board was bound by the arrangement come to in 1884, and gave judgment for the defendants, and against that decision the Board appealed.

At the conclusion of the arguments of counsel, Mr. Justice Grantham, in giving judgment, said that it was not necessary for him to say, and he was not able to say, whether or not he would have come to the same conclusion as the County Court Judge if he had tried the case; but when the agreement was looked at and the reasons of the Board and the reply sent to Lansbury's application, it was impossible to doubt that the Board had treated the road as a new road under Section 145, and that it was to their interest so to treat it. He could not interfere with the finding and send the case back for re-trial, and therefore the appeal would be dismissed. Mr. Justice Lawrence having concurred, the appeal was accordingly dismissed with costs.

Leave to appeal was refused.

Mr. Clarke Williams appeared as counsel for the appellants; and Mr. William Graham for the defendants.

##### ACTION IN RESPECT OF A BUILDING CONTRACT.

THE case of Dearing & Sons v. Richards came before Lords Justices Lindley and A. L. Smith, in the Court of Appeal, on Tuesday last.

Mr. Willes Chitty said this was an appeal by the defendants against an order of Mr. Justice Day, by which he reversed the order of the Master and refused leave to defend. The action was brought by Messrs. Dearing & Sons, building contractors, against Mr. Thomas Richards, Mr. Barlow, and others, in respect of a building contract, and the claim was for 956l. balance of 1,294l., alleged to be due in respect of the contract, which was dated March 2, 1892. The statement of claim set out that the certificate of two architects was to be obtained before payments on the contracts were made to the contractors. Messrs. Bruton & Niblett were the two architects in question. During the carrying out of the work a good deal of dispute took place between some of the parties and Mr. Niblett. On June 16, 1894, Mr. Niblett wrote out what he called a certificate for 1,347l. 4s. due. This was admittedly a mistake for 1,248l. He called that "Installation No. 12," and a final certificate.

Lord Justice Smith: Can one architect give a certificate?

Mr. Willes Chitty: No, certainly not. Continuing, counsel said after that Mr. Bruton wrote that there was a balance of 956l. due. He was of opinion that this second certificate was not written on the contract until one day before the writ was issued.

Lord Justice Lindley asked Mr. Boxall what the plaintiffs had to say to this.

Mr. Boxall contended that the final certificate by one of the architects was enough.

Lord Justice Smith: How do you say you have got the certificate of the two?

Lord Justice Lindley: You cannot say this is an undated authority. I think the Master was right.

Appeal allowed, costs to follow the event.

##### INJUNCTION AGAINST THE WINDSOR CONSERVATIVE CLUB.

IN the Chancery Division on Wednesday, Mr. Justice Chitty had before him the case of Kearley v. the Windsor and District Conservative Club. It was a motion by Mr. Levett, Q.C., on behalf of the plaintiffs, Kearley & Tonge, wholesale provision merchants, in the City, to restrain the defendants from committing a trespass upon land included in the plaintiffs' site under a deed dated November 25, 1891, whereby the premises known as 97, Peaseod-street, New Windsor, were demised to the plaintiffs' predecessors in title for a term of twenty-one years. The trespass alleged was the building, or attempting to build, on the premises and on the site of the old boundary-wall on the west side of the premises, a structure which would darken the ancient lights of the plaintiffs' premises.

After hearing Mr. Fardell for the defendants, who submitted there was no case for an injunction,

His lordship granted the injunction restraining defendant from erecting on the site of the old boundary wall, or on the site of the yard on the west side, any wall or other structure which would obstruct the ancient lights of the plaintiffs' premises as they were enjoyed previously to the taking-down of the old boundary-wall. Costs would be costs in the action.

#### MEETINGS.

FRIDAY, DECEMBER 7.

*Architectural Association.*—Mr. E. O. Sachs on "The Modern Theatre of the Continent." 7.30 p.m.  
*Institution of Junior Engineers.*—Mr. W. Mallock on "Waterworks and Appliances." 8 p.m.

SATURDAY, DECEMBER 8.

*London and Provincial Builders' Formers' Association (Memorial Hall, Farringdon-road, E.C.).*—Half-yearly Meeting. 7.30 p.m.  
*Queen's College, Cork.*—Mr. Arthur Hill on the "History of Architecture." III. 3 p.m.

SUNDAY, DECEMBER 9.

*South-place Institute.*—Mr. W. Williams on "The Mason's Art." 4 p.m.  
*Sunday Lecture Society.*—Mr. E. Neville-Rolfe on "The Buried Cities of Campania." 4 p.m.

MONDAY, DECEMBER 10.

*Surveyors' Institution.*—(1) Mr. William Sturge on "The Burdens on Real Property and Land." (2) Discussion on that Paper and on the Paper read at last Meeting by Mr. A. Dudley Clarke, entitled "The Incidence of Taxation on Land." 8 p.m.  
*Clerks of Works' Association (Carpenters' Hall).*—Paper by Mr. T. Simpson. 7.30 p.m.  
*Society of Arts (Cantor Lectures).*—Professor Vivian D. Lewis on "Modern Developments in Explosives." III. 8 p.m.

TUESDAY, DECEMBER 11.

*Institution of Civil Engineers.*—Mr. Edw. B. Wain on "Colliery Surface-Works." 8 p.m.  
*University Extension Society (Chelsea Town Hall).*—Mr. Arnold Mitchell on "English Architecture." X. 3 p.m.

WEDNESDAY, DECEMBER 12.

*Sanitary Institute.*—Dr. G. Blundell Longstaff, M.A., Chairman of the Building Act Committee of the London County Council, to open a discussion on "The Sanitary Aspects of the London Building Act, 1894." 8 p.m.  
*St. Paul's Ecclesiastical Society.*—A meeting will be held at the Chapter House, St. Paul's, when objects of Ecclesiastical interest will be exhibited and described. 7.30 p.m.  
*Northern Architectural Association.*—Mr. H. Barnes on "The Economics of Architecture." 8 p.m.

THURSDAY, DECEMBER 13.

*Society of Antiquaries.*—8.30 p.m.  
*Institution of Electrical Engineers.*—(1) Annual General Meeting, Reception of the Annual Report of the Council and Election of Council and Officers for the Year 1895. (2) Mr. C. S. du Riche Preller on "Electrical Steep-Grade Traction in Europe." (3) Mr. H. D. Wilkinson on "Electric Tramways in the United States and Canada." (4) Messrs. R. W. Blackwell (Foreign), and Philip Dawson on "Electric Traction, with Special Reference to the Installation of Elevated Conductors." 8 p.m.

FRIDAY, DECEMBER 14.

*Institution of Civil Engineers (Students' Meeting).*—Mr. S. Henry Barracrough, B.E., and Mr. Lionel S. Marks, B.Sc., on "Some Experiments on the Heat-losses to the Cylinder Walls of a Steam-Engine." 8 p.m.

SATURDAY, DECEMBER 15.

*Institution of Junior Engineers.*—Visits to the Hampton Station of the following Waterworks: 3 p.m., Southwark



## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

## COMPETITIONS.

Nature of Work.	By whom Advertised.	Prize.	Designs to be delivered.
Swage Dispensing Scheme	Hon. Mr. Local Bd. Danvers, Burch St. Rd.	100, 200	Dec. 14
New Covered Markets	Local Improvement Commissioners	500 2nd and 100	Mar. 4

## CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*10-ton Steam Road Roller	Borough of West Ham	L. Angell	Dec. 11
Villa and other buildings, Victoria-street, Barnsey	.....	H. Crawshaw	Dec. 12
Making-up Surrey-road, Bournemouth	.....	Hankinson & Son	do
Institute, St. Peter's Church, Duxbury	.....	Jem Pacey	do
Granite Kerling and Flagging	.....	Isle Brown	do
Earthenware Pipe Sewers (12,000 yds.)	.....	T. S. McCallum	do
Alterations, Hiron Hall	.....	Local Board	do
Seventy-four Houses, Plymouth street, North Tyndal	.....	W. J. Lomas	do
*Construction of Sewers	.....	.....	do
Drainage and Tanks at Workhouse, &c.	.....	H. Mair	do
Houses, Crumlington, Durham	.....	J. G. Crane	Dec. 13
Two Houses for Shale Presses, &c. Urmston Meadows	.....	.....	do
Additions to School, Wiltshire-road	.....	Jno. Bowden	Dec. 14
Wharf, Bangor, on Down	.....	T. H. Fleming	do
Draughting, &c. Brook-street and others	.....	Russell & Lockwood	Dec. 15
Sheds, &c. at the Works, Liverpool, Lancs	.....	E. J. Furnell	do
Semi-detached Villas, Moor Lane, Overland	.....	W. H. D. Horsfall	do
Road Stones	.....	.....	do
Sewer Pipes and Laying, also Tank, Battle Bridge-lane	.....	M. F. S. Kynersley	Dec. 17
New Road, New Harry, Craggan	.....	F. D. Clark	Dec. 18

## CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Pipe Sewer and Manholes, Warwick-road, Speckhill, Birmingham	.....	.....	Dec. 18
Tar-paving, Hornchurch	.....	F. J. Smith	Dec. 19
Shaving, & Lower King's-road, Berkley	.....	A. C. Meek	Dec. 20
Masonic Hall, Clons, Ireland	.....	J. M. Calvert	do
Waterworks, Bredon, & St. Joseph	.....	St. Mary	do
*Laundry at Workhouse	.....	St. Mary	do
*Brick Gasholder Tank	.....	St. Mary	do
*Sanitary Work at Workhouse	.....	St. Mary	do
Alfington, & St. Mary's, London	.....	St. Mary	do
Asylum, Haywards Heath	.....	St. Mary	do
Schools, Westgate Hill	.....	St. Mary	do
*Municipal Technical School	.....	St. Mary	do
Monaghan	.....	St. Mary	do
*Extension Sewerage	.....	St. Mary	do
*Waterworks	.....	St. Mary	do
Schools, Craven Arms, Salop	.....	St. Mary	do
Additions to Schools, Kneekles	.....	St. Mary	do
*Stables, & Little Cadogan-place	.....	St. Mary	do
Three Cottages, Maltby Farm, Laughan, near Colindale	.....	St. Mary	do
Farmhouse, & Grimsdale, near Carlisle	.....	St. Mary	do
School, & Chapel, at Bishopston, near Bristol	.....	St. Mary	do

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be made in.
*Clerk of Works or General Foreman	Bernardine Vestry	26	Dec. 12
*Clerk of Works	East Ashford Union	100	Dec. 14
*Assistant, Water Engineer's Department	Durham Corporation	100	Dec. 17

Those marked with an asterisk (\*) are advertised in this Number. Competition, p. 1v. Contracts, pp. 1v, vi, vii, and ix. Public Appointments, p. xviii.

Vauxhall, 3.30 p.m., Grand Junction. 4.30 p.m., West Middlesex. By permission of the respective Engineers, Messrs. J. W. Reaster, A. Fraser, and Mr. H. Harvey, M.M.Inst.C.E.

Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." IV. 3 p.m.

## RECENT PATENTS:

## ABSTRACTS OF SPECIFICATIONS.

20,127.—MACHINERY FOR MAKING PLUMBERS' TRAPS: A. F. Davies.—This is a lady's invention, and it deals with somewhat complicated machinery for making lead traps. Special forms of traps are made by machinery adapted to turn them out economically, and a difficulty in manufacture is met by controlling the flow of lead to the machines.

22,275.—CHIMNEY FLUES: E. H. Morgan.—To economise heat and prevent down-draught, a metal box or case is inserted in the flue. The case is fitted with baffles-plates, which cause the smoke to make a zigzag passage and prevent it from descending.

23,997.—CHIMNEY-POTS: A. Girvan.—This pot has a vertical pipe the bottom part of which is entered in or sealed on the top of the chimney. The upper part of the vertical pipe communicates with a globe enlargement into the bottom of which and from the top of which lead-pipes are fixed to the globe obliquely so that a number of cross passages are formed into and through the globe. The oblique passages cause a draught and dilute the smoke with air. In the case of a side-wind the smoke is discharged from the oblique pipes fixed on the upper part of the globe. Each oblique pipe in the upper surface of the globe is in a line with a bottom cone.

25,037.—WINDOW-SASHES: T. Downie.—This patent relates to another invention for swivelling or turning in the window-sashes for the purposes of cleaning, &c.

7,420.—SASH-WEIGHT: W. Hodgson.—The sash-weight which is the subject of this patent is made up in sections to adjust the weight to that of the sash, and each section is enabled to be keyed on to or joined to the preceding section.

13,810.—WINDOW-SASHES: E. G. Kendall.—This is yet another invention to enable the sashes to be reversed or turned into the room for the purposes of cleaning, &c.

16,812.—FRENCH-WINDOWS OR CASEMENTS: R. H. Wilhelm.—In French-windows having sashes opening outwardly, hinges with leaves afford a means of turning and locking in the sashes for cleaning and other purposes.

## NEW APPLICATIONS FOR LETTERS PATENT.

NOVEMBER 21.—22,521, G. Napier, Sliding and Swivelling Doors and Partitions.—22,527, A. Barr, Windows.—22,528, C. Picking, Bricks or Blocks to be employed in the construction of the floors of fireproof and other buildings.—22,515, J. Craig, Window-Sash Fasteners.—22,545, P. Willis, Ratchet Brackets.—22,548, R. Evered and N. Coleman, Flushing Cisterns.—22,550, R. Lofthouse, Ventilators.—22,558, G. Czerwonky, Roofing Tiles.—NOVEMBER 20.—22,421, A. Stanish, Self-Opening Door.—22,427, W. Youlten, Water Bars for Casements.—22,441, H. Lake, Machines for cutting or dividing strips of veneer into lengths.—22,451, W. Wilson and H. Weedon, Fastenings for Glazing.—NOVEMBER 21.—22,507, J. Williams, Casements—

22,509, E. Howard, Flushing Tanks.—22,510, S. Rowley, Water-closets.—22,519, P. Willis, Machines for effecting the opening and closing of doors from a distance.

NOVEMBER 22.—22,523, C. Smith, Drains.—22,527, E. Stimson, Lathing.—22,532, H. Lake, Fastenings for Doors.—22,533, J. Lenba, Paving-stone.

NOVEMBER 23.—22,555, J. Whitehead and A. Herbert, Sash-fasteners.—22,574, R. Dean, Flushing-cisterns for Water-closets.—22,575, J. Macpherson, Pans-trousers and tins.—22,578, J. Corder, Chimney or Ventilator-top.—22,589, F. Banting, Window-fastener.—22,702, T. Crapper, Expanding-plug for Drain-pipes and Traps.—22,721, C. Russell, Pipe and Rod-fasteners for Lath and Plaster and Flimsy Walls and Ceilings.

NOVEMBER 24.—22,772, J. Green and W. Oates, Sockets and Earthenware Pipes.—22,773, J. Green and W. Oates, Joints in Earthenware Pipes.—22,774, J. Green and W. Oates, Jointing Earthenware Pipes.—22,775, J. Green and W. Oates, Earthenware "Access" pipe.—22,793, W. Orr, Concrete and Composite Buildings or Structures.—22,815, T. Griffin, Ventilators and Construction of Greenhouses.—22,816, W. Bailey, Flushing-cisterns.—22,832, W. Tanner, Door-slides.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

13,554, A. Adams, Bolts, Locks, Latches, Fastenings, and Stays for Casements, Sashes, Windows, Doors, &c.—20,555, B. Nicklin, Door-bolts, &c.—20,518, I. Bonvalois, Door and Window Check.—20,740, H. Widdie, Locks and Latches.—20,774, E. Harnett, Hinges.—20,777, F. Miller, Water-closets.—20,930, J. Merrill, Water-closet Basin.—21,272, T. Percoc, Sewers.—21,305, O. Whitehead, Disinfecting Water-closets.—21,397, I. Chandler, Draught Excluder for Bottoms of Doors.—21,439, E. Lacey, Electrical Sewer Ventilator.—21,518, H. Drimer, Scaffolds for Buildings and Appliances therefor.—21,530, A. Sinclair, Doors.—21,511, T. Houghton, Windows.

## COMPLETE SPECIFICATIONS ACCEPTED.

## [Open to Opposition for Two Months.]

454, D. Aiken, Window Sashes.—1,953, C. Ellis, Ventilators.—1,954, T. Holliday and J. Kobson, Constructing Window sashes for obtaining ventilation with reduced Draughts.—1,422, S. Morley, Gutters.—3,449, W. Johnson, Sash-pulleys.—13,025, G. Pollard, Window-sash Fasteners.—15,447, J. Foote, Window-sash Fasteners.—17,715, H. Hadlan, Camping Devices.—17,724, H. Hadden, Clamping Devices.—19,119, J. Foote, Pulleys for Window-frames.—20,248, F. Furness, Tiles for Floors, &c.

## SOME RECENT SALES OF PROPERTY.

## ESTATE EXCHANGE REPORT.

NOVEMBER 22.—By *Osborn & Mercer* (at Cheltenham): The Gotherington Estate, "The Trumps Farm" near Cheltenham, containing 144 a. 7r. 6bs.; "Moat-house Farm," containing 13 a. 3r. 11b.; 2,000 a. enclosures of pasture, 25a. 2r. 11b.; 4,000 a. five fresh lot cottages and enclosures of orchard ground, 43 acres, 730 a. 13b. 13r. 23. By *Julius & Son*: "Gleadthorpe," Whitton-road, Twickenham, u.t. 75 yrs. g.t. 35, 355, 58, 430 a. 13b. 13r. 23. By *Julius & Son*: "Gleadthorpe," Whitton-road, Twickenham, u.t. 75 yrs. g.t. 35, 355, 58, 430 a. 13b. 13r. 23. By *Julius & Son*: "Gleadthorpe," Whitton-road, Twickenham, u.t. 75 yrs. g.t. 35, 355, 58, 430 a. 13b. 13r. 23.

NOVEMBER 26.—By *Mallett, Booker & Co.*: 21, Devonport-st., Hyde Park, u.t. 41 yrs. g.t. 201, 1,000 l.—By *Beard & Co.*: 21, Westbourne Park, u.t. 60 yrs. g.t. 186, 100, 5,000 l.; 21, Prince of Wales-road, Kensington Town, u.t. 41 yrs. g.t. 74, 80, 1,000 l.—By *Herman Bros.*: "Ravensing," Stamford Hill, u.t. 77 yrs. g.t. 351, 400 l.—By *Elliot, Son & Beyton*: 26, Montagu-st.,

Portman-sq. u.t. 41 yrs. g.t. 261, 351 l.—By *Weatherall & Green*: No. 177, Upper Thames-st., f. 2,600 l.; 48, 50, and 52, Mark's-road, Camberwell, f. 2,600 l.; 83, Usher-road, 74 and 76, Armagh-road, u.t. 61 yrs. g.t. 14, 720 l.; 6, Selwyn-road, u.t. 54 yrs. g.t. 41, 250 l.; 57, Beauchamp-road, u.t. 58 yrs. g.t. 71, 100 l.; 141, 415 l.—By *Montagu, Robinson, & Harrison*: No. 323, Clerkenwell-road, f. area 3,650 ft. r. 4,000 l.; 6,000 l.; 28, 33, and 35, Margrove-road, Battersea, u.t. 76 yrs. g.t. 181, 65, 735 l.—By *Perkins & Lister*: 52 and 51, Mansford-st., Hackney, f. r. 704, 1,200 l.; 25 to 27 (odd), Dec-st., Poplar, u.t. 79 yrs. g.t. 156, 850 l.; 26 to 36 (even), Parrot-sq., Bethnal Green, u.t. 63 yrs. g.t. 212, 158, 1,400 l.; 30 and 32, Rope-makers' Field, Limehouse, f. 1,200 l.; four fire-iron cottages, Chingford Hatch, Chingford, 105 l.; 24, 36, and 38, Dove-row, Hackney-road, u.t. 12 yrs. g.t. 31, 164, 200 l.—By *Brown*: 24 to 30 (even), Kharicton rd., Plaistow, u.t. 69 yrs. g.t. 121, 570 l.—By *Martin, Clarke, & Co.*: 6, Station-road, Ankerly, u.t. 84 yrs. g.t. 105, 1,454, 400 l.; 81, Abbott's-road, Bromley-by-Bow, u.t. 79 yrs. g.t. 54, 275 l.

NOVEMBER 28.—By *C. P. Whiteley*: 33 to 45 (odd), Elm Pk., Brixton, f. r. 174, 2,500 l.; 61, 63, and 65, Elm Pk., f. r. 721, 1,200 l.—By *E. Evans*: 71, Protheroe-road, Fulham, u.t. 97 yrs. g.t. 54, 190 l.; 122, Maygrove-road, Kilburn, u.t. 76 yrs. g.t. 71, 75, 300 l.; 2 to 16 (even), Victoria-pk., Old Kent, f. r. 204, 555 l.; 5, Winscombe-st., Highgate, u.t. 84 yrs. g.t. 58, 187 l.

NOVEMBER 29.—By *Rushworth & Stevens*: F.R.G. of 491, Allcroft-road, Kentish Town, reversion in 70 yrs. 1,281 l.; f.R.G. of 211, reversion in 71 yrs. 540 l.—By *Newton & Co.*: 57, Thornhill-sq., Barnsbury, u.t. 51 yrs. g.t. 21, 285 l.; 37, Lonsdale-sq., u.t. 15 yrs. g.t. 10, 150 l.; 34 and 36, Gifford-st., Caledonian-rd., u.t. 60 yrs. g.t. 124, 535 l.; 2 to 12 (even), Saberton-st., Canning Town, u.t. 60 yrs. g.t. 184, 400 l.; 12, 1 to 4, Twickenham-road, Hackney, u.t. 24 yrs. g.t. 704, r. 198, 64, 610 l.; 5, 6, 7, and 8, Elizabeth-pk., Tottenham, u.t. 71 yrs. g.t. 181, 200 l.; 47, 51, 53, and 55, Whiteley-road, Dulwich, u.t. 73 yrs. g.t. 261, r. 224, 48, 490 l.; 79, Street Green-rd., Finsbury-pk., f. r. 824, 1,550 l.—By *Glover & Harrison*: 51, Mann-st., Waltham, u.t. 86 yrs. g.t. 51, r. 361, 84, 230 l.—By *Perkins & Lister*: 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 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NOVEMBER 29.—By *Rushworth & Stevens*: F.R.G.









# The Builder.

VOL. LXVII. No. 2767

DECEMBER 15, 1914.

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Proposed New Premises, Kingland: Mr. C. V. Johnson, Architect.—"Hill Wootton," Warwickshire: Mr. P. Morley Holder, Architect.—Competition Design for Darlington Municipal Buildings: By Mr. Arthur S. Jones, A.R.I.B.A.—Design for Staircase and Entrance Hall: By Mr. W. T. Barlow, A.R.I.B.A. ....	Double-Page Photo-Lith.

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### Some Suggestions as to Theatre Architecture.



THE author of the paper read at the Architectural Association last week, the main portion of which is printed in the present issue, draws a contrast between the conditions under which

theatre architecture is evolved in this country and on the Continent—more especially in Germany and Austria—which deserves attention. Mr. Sachs, who is exceptionally well acquainted with theatre architecture and theatre work generally on the Continent, maintains that in the case of large Continental theatres the element of architectural effect receives very serious consideration; the architect is selected, it is true, for his experience in the practical problems of theatre-construction, but not for these alone; he is expected to be an architectural artist possessed also of a certain kind of special technical experience; and the designing of a large theatre, if successfully carried out, is enough in itself to give the architect a considerable status in his profession. In England, on the contrary, the building of a theatre is mainly a matter of business speculation; the object is that it should pay, and that it should pay as soon as possible, and the consequence is that the main thing expected of the architect is to provide a house which shall be comfortable and safe at as small a cost and in as short a period as possible. It is no great wonder if in that case architectural design should become a very secondary consideration; there is, in fact, no time for it; and the utmost that is aimed at is to produce a decent-looking exterior, in which the most readily available materials for the particular architectural clothing which is in fashion at the time are put together to produce a façade which may claim just the merit of being a decent piece of street-architecture, about on a level with the better class of large shops and business premises.

The contrast as put in Mr. Sachs's paper may be a little overdrawn in both directions. It may be true that the theatre architecture which is admired in Germany does not seem quite so admirable to us, and that some English theatres may compare better, archi-

tecturally, with their German rivals than is likely to be admitted by critics of Teutonic tendencies. But in the main the statement of the position is fairly correct. The English public and the English theatre proprietor do not as a rule trouble themselves much about the architecture of the houses. Until recent years, in fact, they troubled themselves about nothing except the absolutely necessary conditions of seeing and hearing properly. Of late there has come over the public a perception that a theatre which is badly planned as to its exits and combustible as to its materials may become a serious danger, and this having been discovered, proprietors are anxious to be able to assure their public that the house will not readily take fire—the auditorium part of it at all events—and that there are sufficient staircases and exit doors to allow of speedy clearance in an emergency. But beyond that we have hardly got. Neither the manager nor the public care much about the architecture of the house. A few plasterers seem to be demanded on the exterior walls, but if those are duly supplied, nothing further is looked for.

This is partly owing to the fact that we are, by hereditary law, such a "practical" people. There was a time when even the pilaster was not called for. Drury-lane, which was opened in the early part of the century with a round of applause, and which, in its original form, was apparently without even its present colonnade and its exceptionally prim portico,\* was an example of what was considered fitting and sufficient in theatre architecture in those days; and in the address attributed to Cobbett (again to quote "Rejected Addresses") the plainness was even specified as a virtue: "You are now got into a large comfortable house; not into a gimcrack palace; not into a Solomon's temple; not into a frostwork of Brodington's filigree; but into a plain, honest, homely, industrious, wholesome, brown brick playhouse. . . . Look at the brick-

work, English audience! Look at the brick-work! All plain and smooth like a quaker's meeting. None of your Egyptian pyramids, to encomb subscribers' capital. No overgrown colonnades of stone," &c. This, no doubt, was meant to be in character for Cobbett the economist; but it was only putting in a playful form what would have been the real feeling of the majority of theatre-goers of the day in this country. When Covent Garden Opera House was rebuilt we had got to rather more magnificent notions, and the "overgrown colonnades of stone" were forthcoming; but this was rather an exceptional occasion; and, after all, what a tame, *fade* piece of work it is beside the Paris Opera House. It is quite sufficient, however, even now, for the architectural demands of the English public, even for an exceptionally important house; as are, in their way, the average façades with pilasters up the sides and vases on the cornice which form the staple of our recent theatre architecture.

The indifference of the public is of course partly to blame for the indifferent architecture of theatres. If the public cared much about having anything better, builders of theatres would have to provide it, but they would certainly have to make the public pay for it by raising their prices of admission, because they could not do it at all otherwise. And hence there is really a very important point, architecturally, in the system of spending public money, national or municipal, on theatres, which prevails so largely on the Continent. The question of Government subsidy to theatres is no new one in these columns, for it was a favourite idea with the late Mr. Godwin, not however so much on architectural as on dramatic grounds; he was one of those who earnestly wished for a national theatre which should be independent of popular taste and popular support. We will not go into that side of the subject here, but we may say that the effect of Government or municipal support might certainly be quite as important in regard to the building itself as to the plays that might be acted in it. The system takes the building of a theatre out of the mere category of business ventures, in which the qualities chiefly sought for in the architect are those sought for in a locomotive engine—"economy, safety, and speed," and allows not only for money but (what is still more important) time being spent on the architectural design, which need not be run up in a hurry to hasten the return for the invest-

\* See "Rejected Addresses"—

"Oh, Mr. Whitbread! lie upon you, sir! I think you should have built a colonnade; When tender Beauty, looking for her coach, Protrudes her gloveless hand, perceives the shower, And draws the tippet closer round her throat, Perchance her coach stands half a dozen off, And, ere she mounts the step, the oozing mud Soaks through her pale kid slipper. On the morrow She coughs at breakfast, and her gruff papa Cries, 'There you go! this comes of playhouses!' To build no porch is penny-wise; Heaven grant it prove not in the end pound foolish."

But the criticism, it will be observed, is solely on grounds of business economy, not of architectural shortcoming.



ment. Except under such circumstances there is little chance for the evolution of theatre architecture in the best sense of the word; and the moral is pointed by the fact that the one recent theatre in London in which an eminent architect succeeded in producing a picturesque and original architectural exterior could not pay its way, and has now, unfortunately, from the "Palace Theatre" sunk to the "Palace Music Hall."

Whether the Continental theatre architects, with all these advantages of circumstance, merit all the praise which has been bestowed upon their productions, depends upon the point of view. They have produced some imposing and palatial buildings. But there are not many instances in which they have produced buildings which have a special theatre character discernible at first sight. They have not indeed always avoided the mere commercial manner of building, for it appears to us that Messrs. Fellner & Helmer, the Vienna specialists, who have built theatres all over Europe, are sought for mainly for the experience which enables them to plan and put up a theatre quickly and completely, having all the knowledge of the practical requirements of the business at their fingers' ends. That kind of achievement, however, does not raise an architect to eminence as such—as a designer of buildings, but rather as a mere constructor. In other cases we find buildings which have a great deal of palatial dignity and splendour, but which do not sufficiently proclaim themselves as theatres. A theatre is not to look like a concert-hall externally; it should be unmistakably a theatre. That the building erected at the Palace Theatre has not this characteristic is probably not Mr. Colcutt's fault, since he, we believe, only supplied an architectural casing for a building first planned independently of his assistance. A theatre, rightly considered, ought to be a very suggestive problem for the architectural designer. It is divided, practically, into two blocks, each planned for a special and peculiar use, different from that of any other kind of building. The auditorium is to seat an audience in a concentric fashion, so that all their eyes may be conveniently directed to the stage; and the stage portion, in a large theatre, is more conveniently and suitably arranged on square lines, and requires a considerably greater height than the auditorium, for the raising and lowering of scenery, &c. Moreover, it is a practical axiom of modern theatre-building that the stage portion should be as completely separated from the auditorium as possible, except in regard to the proscenium opening, for the sake of safety to the audience, as almost all fires in theatres originate on the stage. From these considerations it may be laid down almost as an axiom in the design as well as in the construction of theatres, that the auditorium and the stage portion should be completely distinct in architectural treatment. To design a theatre as a single block of building, on palatial lines, is to throw away the most obvious method of giving distinctive character and expression to the building. The auditorium should show its circular lines more or less, but so as to render it obvious that they are there; and the more decorative treatment is rightly applied to that portion of the exterior. Horizontal extension is the special quality of this portion of the house, for great height in an auditorium is to be avoided as far as possible, as placing the uppermost tiers of spectators in a very disadvantageous position for seeing the actors and the spectacle. The stage portion should be a more plainly-treated block and tending more towards verticality in its lines, hence offering the most marked and characteristic contrast to the auditorium portion; and the wall of the stage portion which is next the auditorium should be emphasised in its treatment—made to appear as solid and monumental as possible, as the outward and architectural expression of the fact that it is the fence-wall, so to speak, between the audience and the stage

portion. Here there are certainly elements enough for the suggestion of marked and characteristic architectural treatment and contrast, of which, however, full advantage is very seldom taken, and of which, it may be admitted, it is impossible to take full advantage, except with a tolerable expenditure both of money and thought. In the Paris Opera House, where both these desirable conditions existed, this contrasted treatment of the two portions of the house externally was obviously kept in view, and the architectural problem has been better met than in most large theatres. It may be urged, in regard to the auditorium portion, that the actual auditorium does not come up to the outer wall of the building, being surrounded by corridors and foyers. But, by making the main corridors concentric with the house, the form could generally be manifested externally to a sufficient extent to give the "theatre character" to the exterior; and, moreover, it must be remembered that the planning of a semi-circular auditorium\* within entirely rectangular enclosing walls necessarily leads to awkwardly-shaped internal spaces and a certain degree of complication in planning. With management, the curved line can generally be shown externally sufficiently to give the architectural character and expression demanded. It is done in the plans of the Hofburg Theatre at Vienna and of the St. Petersburg Opera House, given on another page as illustrations to Mr. Sachs's paper; and it is done in a very complete manner in Herr March's "People's Theatre," at Worms, the view of which forms one of our lithographic illustrations, and which we selected for illustration on that very account, as being a piece of distinctive theatre architecture. It has been done very completely in England in the Shakespeare Theatre, at Stratford-on-Avon; though there, of course, owing to the small size and unpretending character of the house, the problem was a comparatively easy one. Where it is difficult to follow the circular form in the lower portion of a large theatre, owing to the number of necessary rooms to be provided, there will at all events seldom be any difficulty in allowing the curved line to show in the upper portion of the auditorium. And the contrast of curved with rectangular lines is so fine a source of effect in exterior architecture that we should say no true architect would lose it in a case where the practical form and purpose of the interior gives such a decided lead towards such a treatment.

As to architectural style, the type of architectural treatment which, in all its varieties, is comprised under the general terms Classic and Renaissance, seems far more suitable for the expression of a building intended for amusement (for that is after all the real *raison d'être* of the theatre) than any treatment founded on Mediaeval types. The theatre as we have it is an essentially modern and post-Renaissance institution; its architectural expression should be that of dignity, cheerfulness, and refinement, qualities which to our thinking are much more characteristic of the Classic than of the Mediaeval type of architecture. Moreover, the square-headed openings and horizontal lines of the Classic type of design lend themselves better to the treatment of the broad masses of building into which a theatre is or should be naturally grouped, than the details of a style characterised by arched openings and vertical lines.

In regard to the interior design of theatres we are quite in accordance with the suggestion embodied in Mr. Sachs's remark, "Surely a building can be simple and yet beautiful." In this country, at least, tawdriness has unfortunately become almost proverbially the "note" of the interior design and decoration of theatres, inasmuch that a similar quality of design in other classes of building is often stigmatised as "theatrical."

It seems to be assumed that when people meet for an evening's amusement they expect, in order to heighten their spirits, to be amongst gaudy surroundings. To some tastes, at all events, the effect of this gaudiness is depressing rather than exhilarating. The taste for it seems, in the first instance, to have radiated from the stage into the house. The decorations of the scene itself are necessarily more or less ephemeral in character, and under the unreal glare of the stage lighting an unreal glitter and meretriciousness in the stage surroundings may pass without too severe criticism. We know that it is all a sham, and do not take it seriously. But there is no reason why this element of meretriciousness should extend itself to the more or less permanent decorations of the house itself. In fact, there is all the more reason why it should not. The house should be differentiated from the stage, and if a brilliant effect on the stage is specially aimed at, as in pieces in which spectacle plays a large part, there is a practical reason (as Wagner showed in his Bayreuth theatre) for keeping the decorations of the house more sober in key, to heighten the more the effect of the stage spectacle. The proscenium arch is the window through which we look into an imaginary world, and the unreal scene should be as distinctly separated as possible. But the stronger reason for greater reticence and refinement in theatre design and decoration is the architectural one. Why should the interior design of our most important and most popular places of amusement be almost always the scene of a style of decoration which most of us would condemn as tawdry if applied to the drawing-room of a mansion? A bad acquired habit or tradition is partly to blame for this, but the obstacle to improvement is to a great extent to be found in the conditions, already referred to, under which our theatres are mostly built—hurry and the desire to produce the greatest effect at the least cost. There is no time for the study required for a severe and well-thought out decorative scheme; the architect, possibly, has little to do with it; he attends to the plan, construction, and practical requirements, and a firm of "decorators" are called in to make the house as brilliant as possible in as short a time as possible. Nothing good can come of such a system. We want to see theatres in which a sober and artistic scheme of architectural design and decorative treatment has been elaborated by the architect, not with the object of producing mere glitter and restlessness of effect, but of making the most, in an architectural sense of the effect of a class of interior which in reality is peculiarly suggestive for architectural treatment. We want to see well-considered and refined detail instead of commonplace ornament stuck about everywhere, merely because it is supposed that something is wanted and whatever can be most quickly applied will answer the purpose. In recent days this example has in fact sometimes been set on the stage itself. Where plays of "domestic" character are to have a long run, a great deal of taste has been displayed in some instances in the designing and furnishing of the imaginary room in which the actors go through their presentment, and one has sometimes had to wish that the good taste expended on the stage fittings had also pervaded the decoration of the house. These are exceptional instances certainly, and do not go far to contradict our general position, that the inherently factitious character of stage-decoration has traditionally affected all theatre decoration. It is perfectly unnecessary that this should be so; it is perfectly possible to make a theatre-interior an example of as good and pure architectural design as could be found in any other class of interior. But to do this the system must be altered. Good architecture requires time and thought to perfect it, and artistically-designed decoration, even of a comparatively simple kind, is more costly to carry out properly than the

\* We use the term "semi-circular" for convenience; the curve is, of course, not necessarily of that precise shape.



more showy schemes of the commercial decorator. The adoption of the Continental system of spending some public money on theatres would at least give the architect the means and opportunity of producing something better, which under the present régime he scarcely ever has. And the not unnatural result is that the leading architects of the day are scarcely ever called upon to design theatres, and probably have no desire to do so; they know too well what would be expected of them. But all that might be altered if our Government and municipalities took the same interest in theatres as is the case on the Continent.

## NOTES.

**T**HE German Emperor opened the new home of the Reichstag on Wednesday last week. We have frequently had occasion to refer to the building, but may here recapitulate a few facts in regard to its history. It is the outcome of an architectural competition limited to Germans. This was in 1882, and there were 196 competitors. The foundation-stone was laid in 1884 by the Emperor William I. Twenty-two millions of marks, or about 1,100,000*l.*, have been spent on the building, and 15,000*l.* more are necessary for the completion of the fresco and sculptural decoration. The architect's competition premium was 750*l.*, he was then engaged at an annual salary of 1,500*l.* during the progress of the works, and receives a fee of 6,000*l.* on its completion, making together about 22,000*l.*, or a commission of under 2 per cent. *without any office or other expenses* on the total amount. Herr Wallot has had to work under most difficult circumstances with constantly changing building committees. Three Emperors have reigned during the erection of the building, and each ruler's special wishes had to be attended to. The German public and artists are generally satisfied as to the interior of the building, which contains much interesting detail. As to the exterior, opinions differ at Berlin. The academical conception is criticised by many, the "coldness" of the rendering, and the iron and glass cupola. The latter is, to a great extent, the result of the constant change of instructions which actually now leaves the building with two complete sets of foundations for different cupolas. But a few months ago the German Emperor, when at Rome, pronounced the building to be "the acme of bad taste" (Gipfel der Geschmacklosigkeit), and he has obviously acted according to this opinion in keeping the architect's name out of all the orders and distinctions given on the occasion, although the Clerk of Works and several of the foremen have come in for honours. This insulting manner of treating the architect will probably have the contrary effect to what was intended. As far as English taste is concerned the building is not likely, we admit, to be much admired; it is a Classic style of a type which we have learned to think somewhat tawdry and unrefined, like much of modern German architecture; yet there is an undeniable largeness and power about the look of the main front and the treatment of its details. The worst point is the aforesaid cupola, and that we candidly think the poorest central feature to a national Parliament House that we know of in Europe. The question is, however, would the Emperor's taste have evolved anything better?

**H**ERR WALLOT'S artistic brethren seem at any rate disposed to do their utmost to show their contempt for the Emperor's conduct towards him, and the "Wallot Banquet," held, on Friday the 7th, at the Kroll Theatre in Berlin, was a most notable demonstration of its kind. The amalgamated architectural societies of Germany, together with several of the senior artistic bodies, had arranged the

gathering, at which 650 guests were present, the invitations being limited to architects, painters, and sculptors. The leading architects from every part of Germany were assembled, headed by the presidents of the various bodies. After a number of addresses had been presented to Professor Wallot, who was also the recipient of numerous honorary degrees, &c., Anton von Werner, as president of the Society of Berlin Artists, commenced the long list of laudatory toasts. The annoyance generally felt in artistic circles at the Emperor's decisions as to Herr Wallot and the favouring of the lady-painter Madame Parlaghi, was humorously expressed in a series of *tableaux vivants*, entitled "Wallotria." A very German incident was the introduction of a model of the Houses of Parliament built up entirely in bread and cheese, with sausages for the columns, labelled, "The Acme of Good Taste"; a very doubtful method of signalling "good taste." In one corner of the room was an automatic machine which supplied gold medals "to ladies only"; while on the lost property board of the establishment a large paste-board "Order of the Red Eagle" had been hung and labelled "Forgotten on the 5th inst." Herr Wallot was much moved by the appreciation of his *confrères*, and, in thanking them, laid special stress on the necessity of architects not being hurried by their clients if really good work was expected of them, and in that sentiment at least we can sympathise with him entirely.

**T**HE death of M. de Lesseps closes a career of which the end has been a melancholy contrast to the earlier part, but we confess that we cannot join in the adulations and eulogiums with which the Press commentaries on the event abound. A long time before the final crash of the Panama scheme we showed, in an article in the *Builder* of August 6, 1887, the whole category of the engineering impossibilities and contradictions of the scheme, which its promoter, if he had sought and listened to the most competent engineering advice, ought to have been fully aware of. The ostentatious visit of inspection to the site, with the house built for the occasion, and the empty parade of reporting on the condition of the works, was to our thinking an absolutely immoral procedure, a flagrant trifling with the interests of others and of the French nation at large. Whether the legal condemnation of M. de Lesseps was justifiable or not we do not undertake to say; but he certainly was morally guilty of a huge misrepresentation. A number of the daily papers, we observe, including that preposterous person the *Times* Paris correspondent (the *Times* itself is apparently better informed), still cling to the superstition that M. de Lesseps was an eminent engineer who made the Suez Canal. He was not an engineer and had little or no engineering knowledge. He did the diplomacy and financing: that was all.

**P**ROFESSOR AITCHISON will continue, in his next course of Royal Academy Lectures, the subject of the "Advancement of Architecture," which he treated in so interesting and suggestive a manner in his lectures in the early part of the present year.\* The first of the ensuing course of lectures will be delivered on Monday, January 28.

**I**T cannot be said that architectural study is flourishing very much at the Royal Academy, if we regard the small number and mostly rather timid character of the drawings which were exhibited on Tuesday, and contrast them with the kind of architectural drawing which the students' competitions at the École des Beaux-Arts call forth. The subject given for "design in architecture" was "A Public Library in a Town," and Mr. Percy Edward Newton's

design, which gained him the Travelling Studentship, is decidedly the best, though the general effect of the large-gabled front is rather heavy. The merits of the design are an effective grouping of the three large windows in the principal story, making the prominent point in the design; a good plan; and a very prettily-sketched bas-relief of the figures in the lower portion of the facade. The defects are (besides the somewhat awkward appearance of the wide gable) the finish of the large oriel window with a flat soffit projecting from the wall face, which has a very awkward look, while this ponderous projection seems also rather to crush the small mullioned window beneath; and the fact that the range of large windows before alluded to, well enough as it looks in the elevation, does not correspond with the treatment of the plan; the windows look like the three windows of the large room running across the front, whereas in fact one of them is a staircase-window, and as such certainly demanded a specialised treatment. The sets of measured architectural drawings, for which the "orangery" at Kensington Gardens was given as a subject, are very good in the main, and two or three are so nearly equal in merit that it must have been rather difficult to award the medal, which has been given to Mr. G. Weald; the second medal to Mr. Pieter Rodeck. A prize for plan only—"Plan of a Building"—(the subject being "A Government School of Art for a large Manufacturing Town") is an excellent and we think new idea at the Academy; there can be no doubt that the prize has gone to the right competitor, Mr. E. T. Richmond, whose plan is in fact the only one that shows any sense of the importance of aspect in rooms devoted to drawing. For a set of architectural designs (upper school), the subject being a fire-place, the prize of 25*l.* has been awarded to Mr. Henry Seton Morris for a very pleasing design with a broad frieze of carved foliage of Renaissance feeling on the upper portion, and a plain segmental arch to the recess over it. In the lower school the prize of 10*l.* has been awarded to Mr. C. C. Brewer, who in the treatment of his subject (a water-gate) has contrived to invent something novel and at the same time picturesque in the way of a capital, which is not done every day. Hanover Chapel, soon to be destroyed, has been not inappropriately set as a subject for the competition for perspective drawing in outline, the medal for which has been awarded to Mr. Lacey. The designs for the decoration of a public building are none of them remarkable, and the prize one, by Miss Hilda Koe, probably owes its position a good deal to the fine and spirited character of the full-size cartoon sketch of two of the figures; the arrangement of the composition is not very decorative, the large piece of piling occupying a considerable portion of the picture is out of keeping, and there is no harmonious grouping of the figures; in this respect No. 128 is better, but it must be admitted that the cartoon figure is rather weak. The first and second prize works in sculpture are among the best work of the year; the subject, "The Fates," is treated by Mr. F. Derwent Wood with true sculpturesque feeling, the three figures forming a group which seems dominated by one leading idea and forms a complete whole; the only objection we make to it is that the two side figures want some support beneath their feet, both in regard to line and to the sense of architectonic construction, which should always be felt in a sculpture group. There is a great deal of merit also in the second prize design by Mr. F. Thomas, which is less open to criticism, but at the same time less original in composition and conception than that of Mr. Wood. No. 171, with the central figure standing and looking upward, is a spirited group. The Creswick prize (subject, "A Moorland") has been awarded to Mr. Percy W. Gibbs, whose work is decidedly the best in colour; but in this respect

\* Printed in full in *The Builder* for Feb. 3, 10, 17, 21, and March 3 and 10.



generally the paintings sent in for this prize are rather above the usual level, and do not exhibit so much rawness of colour as we have encountered on former occasions.

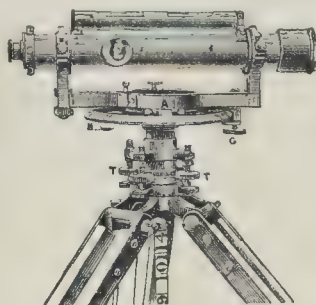
ONE of the most energetic of the various bodies of traders formed for the purpose of keeping a watch upon railway charges, is the Lancashire and Cheshire Conference, presided over by Sir J. J. Harwood. The Council have just issued a circular advising continued resistance to the increased rates, until their reasonableness has been established by the railway companies; and have prepared a form of complaint in order that their members may submit lists of rates objected to, for immediate presentation to the Board of Trade. This course has been adopted in order that advantage may be taken of the Railway and Canal Traffic Act of the present year, which prescribes that complaints of increases must be made within six months of the passing of the Act. This time will expire on February 15, 1895. During the two years which have now elapsed since the companies made their sweeping changes in the rates for goods and mineral traffic, the amounts shown as "traffic accounts due to the company," have, in the case of most of the lines, been steadily mounting up. The London and North-Western "outstandings," for instance, were 167,890*l.* more in June last than in June, 1892. This sufficiently indicates the magnitude of the differences between the companies and their customers which still need adjustment, and it is high time that an authoritative decision should be given as to whether or not the resistance to the disputed rates is justifiable.

THE conference summoned by the Board of Trade last week to discuss the question of light railways was a thoroughly representative one, and the proceedings afforded proof that considerable interest is taken in this subject. The President of the Board of Trade, who presided, dwelt upon several aspects of the question, in a speech distinctly favourable to the project, and a sub-committee of the conference was appointed to consider the whole question, and to draw up a report with a view of legislation being founded upon it. The committee consists of Members of Parliament, railway experts, and others intimately acquainted with the subject, and is to be under the presidency of Sir Bernhard Samuelson, who, it will be remembered, personally investigated and reported upon the conditions of transport on the Continent several years ago. The points specially present to the minds of many of the speakers—the relief of agriculture and the better housing of workmen in large towns—hardly come within our province. There is no doubt, however, that the builder and contractor, as well as the agriculturist, would frequently find the light railway very convenient, and it is well that the matter should receive the consideration it undoubtedly deserves. The questions of cost, and the relaxation of the rules regulating the construction, maintenance, and working of railways will be the principal points for the consideration of the Committee. That of the public safety is, of course, largely bound up with these, and will also demand careful consideration. Unless the already over-burdened rates are to be drawn upon, the venture must pay to ensure its success; it will not suffice that this or that locality or class is benefited. In some cases, certainly, the existing railways might undertake the construction and working of these lines to act as feeders to their own systems, even without immediate prospect of profit. The tone of the railway representatives at the conference was not unfavourable; in fact, the whole of the proceedings were marked by an absence of hostility.

THE new form of level called the "Gradient-Telemeter Level,"\* is one

\* Short's Patent: manufactured by L. Casella.

of the most admirable inventions in instruments for survey that has been made for a long time. It enables the surveyor to obtain horizontal linear distances without chaining, and levels on gradients without "stepping." An illustration of the instrument is subjoined. The principle of the instrument is that its two vertical axes, the inner and the outer one, are inclined to one another at an angle, instead of being concentric, as in the theodolite. On the telescope being rotated on the inclined axis a vertical dip is given—i.e., a vertical angle is taken, and this angle is expressed on a graduated scale marked on the circle H. Thus, where the levels are to be taken on a falling gradient where the staff falls below the line of the telescope level, the telescope,



having been levelled in the usual manner, is then to be turned on the eccentric axis until a reading on the staff can be taken, when the graduated scale on H will give the angle of deflection passed through to sight the reading on the staff, but as the measurement is made not on the arc direct but on an inclined plane proportionate to it, a great minuteness of measurement can be obtained with a very small possible error. But also, whether on level ground, or on a slope (within certain limits of gradient), the horizontal distance can be obtained, as thus described in Mr. Casella's prospectus:—

"When the instrument is levelled, and the horizontal line of sight is above the top of the 14-ft. staff, proceed as follows:—Loosen the clamp and move the telescope until the index reaches gradient 100, and sight the staff; if the line of sight is still above the staff, move the telescope and index farther until the upper part of the staff is visible through the telescope. Suppose the index is then near Gradient 25, move it again until it cuts exactly Gradient 25, and take the staff reading at that gradient—suppose this to be 13.66 ft.

Then move the index on to 62.50 and again read the staff; let this reading be 8.45 ft. and take their difference thus— $13.66 - 8.45 = 5.21$

Eliminate the decimal point and the horizontal linear distance as in above illustration is 521 ft., without any calculation being necessary for hypothetical difference or for other reductions. Any pair of Gradients in the list added will give by the difference of their readings the horizontal distance in this manner—the choice of gradients being determined by the nature of the ground."

It may seem that we are here measuring horizontal distances by very small angles, but the multiplication of arc-measurement by measuring them on the eccentric plane and not directly enables the surveyor, as before said, to get a much more accurate result than by direct arc-measurement, and the instrument has, according to a report of a Committee of the Royal Engineers, been proved in practice to give horizontal measurements with an average error of about 2½ in. in a distance of over 600 yds., got by a short series of positions. When it is considered that this can be done over ground where a chain could not be taken, with an accuracy as great as can ordinarily be got by chaining under average circumstances, no more need be said to recommend the instrument to the attention of surveyors.

THE lesson to be learnt from the unfortunate panic at the Belfast school

last week is the necessity of enforcing an emergency lighting wherever crowds assemble in artificial light. The absolute darkness on the gas going out could have been easily modified by a few oil lamps; these would have greatly helped to assure the audience and assisted the finding of the exits. The cost of emergency lighting is so small that there is no reason why its introduction in assembly-halls, and even churches, should not be made compulsory, in the same way as the arrangement of all doors to open outwards might be enforced.

WE observe that No. 50, Lincoln's Inn Fields is in course of demolition. No. 50 and No. 2, Portsmouth-street, Lincoln's Inn Fields Chambers, retain their original elevations as designed by Inigo Jones, and still bear Queen Henrietta Maria's badges, the rose and the lily, on their pilasters; but the fronts of Nos. 51-2-3 have, apparently, been altered since. No. 2 retains its original red-brick facing, the others have been stuccoed or painted over. The house over the Bear-yard-passage, between Nos. 2 and 50, is modern; Nos. 56, and 61-2-3, are also of later date. The coming change will probably result in a departure from the first design. Thus Arch-row, as first built by Jones, is gradually losing its pristine character.

#### THE ARCHITECTURAL ASSOCIATION: *The Modern Theatre of the Continent.*

THE usual fortnightly meeting of the Architectural Association took place on the 7th inst., in the meeting-room of the Royal Institute of British Architects, Mr. E. W. Mountford, President, in the chair.

Mr. E. M. Flashman was elected a member of the Association.

Several gifts to the library were announced, and votes of thanks were presented to the donors.

Mr. B. F. Fletcher, junior hon. sec., announced that, on and after December 31, the fee for a course of instruction in Studio, Divisions 1, 2, and 3, would be two-and-a-half guineas, including one extra studio subject.

The President stated that satisfactory arrangements had been made for a common-room, which would supply a long-felt want. As soon as the room was suitably furnished and decorated, it would be opened.

Mr. E. O. Sachs then read a paper on "The Modern Theatre on the Continent."

In commencing his paper\* Mr. Sachs observed that the Continental differed from the English theatre in being in most cases a public building, built and supported largely out of the public funds, the theatre built as a private speculation or investment being the exception. Continental theatres might be classified as follows:

- I. Court theatres.
- II. National and government theatres.
- III. Municipal or district theatres.
- IV. Subscription theatres, with or without court, government, or municipal subsidy.
- V. Private theatres, with or without court, government, or municipal subsidy.

The private theatre alone was intended to be a money-making concern.

**Court Theatres.**—The court theatres were essentially the luxury of royalty, originated and kept up at their expense. The enjoyment of the entertainment given at these playhouses was, however, now mostly open to all comers on a payment for admission, but it rested entirely with the royal owners to what extent the public was allowed to avail itself of the opportunity of entertainment, and at what figure. An exception was only made on rare occasions of national festivity, when the auditorium was thrown open to all comers free of charge, the visitor taking his seat in the stalls or gallery according to the rule of "First come, first served."

**Government Theatres.**—The national or government theatre was generally run on the same lines as the court establishments, with the exception that the foundation and maintenance of the institution was officially held out to be chiefly in the interests of art and education. The national theatre in a way stood on a par with the national museum or picture gallery; but, being kept up

\* The paper having been of unusual length, we are obliged to give the first portion of it in a brief résumé only.



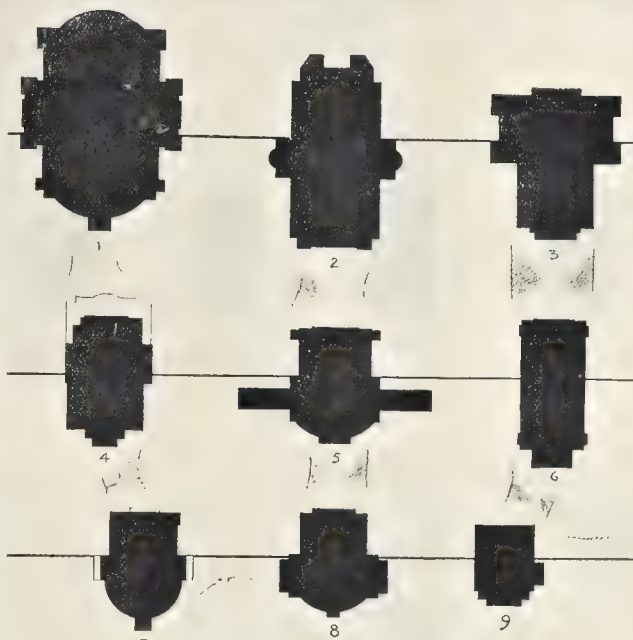
out of the country's taxes, it was practically reserved for the office-holders, the *savants*, and the moneyed, the latter however enjoying the entertainment at a lesser cost than would be the case if they visited an establishment run on money-making lines.

**Municipal Theatres.**—The municipal theatre was generally intended for educational and recreative purposes; all classes were free to enjoy the entertainment at a minimum cost, and, outside the actual outlay for the building, the ratepayers, as a rule, only had to make up the small difference between the actual expenditure and the amount of admission-money received. There were no profits to make, no great risks to cover, and the inhabitants hence had their entertainment at cost price. Of course, there were endless variations in the management of a municipal theatre. The favourite way latterly had been to put the building and fittings, which had been paid for out of the rates, at the disposal of a good manager, and to allow him a small subsidy on condition that a fixed approved scale of admission and booking charges was not exceeded. Would-be lessees competed for the post, stating to what extent they require to be subsidised. A heavy surety had to be found by the lessee to cover all eventualities. Contracts between the manager and the municipality generally dated for a number of years at a time, and when a new lessee was once engaged, matters as a rule ran very smoothly.

**Subscription Theatres.**—The subscription theatre was run on lines similar to the municipal institution, with the great difference that its existence was primarily due to a desire on the part of the cultured and the moneyed to satisfy their desire for the luxury of a good play. The subscribers who built the theatre frequently reserve to themselves the privilege of selecting seats, but otherwise their share in the enterprise generally gave them no distinction. Subscription theatres seldom received assistance from Government or Court exchequers, though there had been one or two notable cases in Austria. The municipality, however, generally gave substantial help, partly, perhaps, in the form of a good site, and sometimes in the form of a subsidy to cover the expenses of keeping the building in general repair. The erection of a subscription theatre, generally let off the municipality very cheaply, as an outcry for a new playhouse would always have to be satisfied, sooner or later, and were it not for the voluntary helpers this would be at the entire cost of the ratepayers. The latest variety of subscription theatre was the one which was built and run essentially on democratic lines for the education and recreation of the working classes.

**Private Theatres.**—The private theatre abroad was managed on precisely the same principles as our own. In exceptional cases private theatres receive subsidies from the Government or Municipalities to facilitate the production of new plays subject to conditions as to the charges of admission, but these cases were very rare indeed. Subsidies by political parties for the furtherance of their interests were, however, not quite so uncommon. Operas were but seldom found in private institutions abroad, the private theatre being practically always the home of the drama. As a rule, municipal and subscription theatres, and to a certain extent the theatres of the minor German Courts, were built both for opera and dramatic performances, which alternated nightly or weekly. The successful planning of these houses depended almost entirely on the clever adaptation of both stage and auditorium to this double purpose—a difficult task indeed, as the requirements for the successful production of a comedy or tragedy were so very different from the essentials of a grand opera.

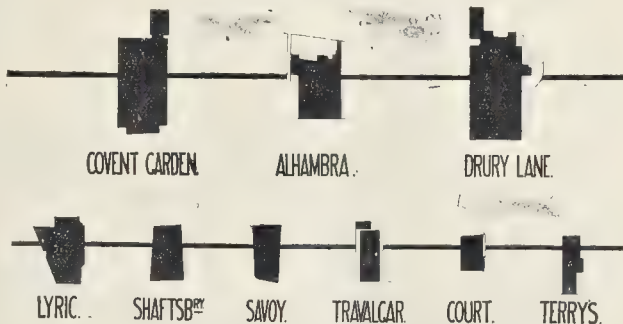
In regard to the question of architectural design, he considered that this was much more thought of on the Continent than in England. The theatres of England were built as investments, mainly, and were utilitarian structures with a little art thrown in as an advertisement. On the Continent the theatrical architect was expected to have a thorough practical acquaintance with the construction of a theatre, but as an architectural designer, not as a mere surveyor; and the architects of the Continent who had been able to satisfactorily complete a modern theatre abroad at once ranked among the first, if not the first, in their profession. Among them he might mention the late Gottfried Semper, in Germany; Baron Hasebauer, in Austria; Von Ibyl, in Hungary; Basile, in Italy; and then there were among the living Garnier, of Paris; Anderburg, of Stockholm; Schröter, of St. Petersburg; Messrs. Fellner and Helmer, of Vienna, and Seeling, of Berlin. Absolute perfection had scarcely been



Comparative Sizes of Some Continental Theatres.

- |                                      |                                 |
|--------------------------------------|---------------------------------|
| 1.—St. Petersburg Court Opera House. | 6. Budapest Opera House.        |
| 2. Paris National Opera House.       | 7. Odessa Theatre.              |
| 3.—Vienna National Opera House.      | 8.—Dresden Court Theatre.       |
| 4.—Stockholm National Opera House.   | 9.—Amsterdam Municipal Theatre. |
| 5.—Vienna Court Theatre.             |                                 |

## LONDON.



Comparative Sizes of London Theatres.

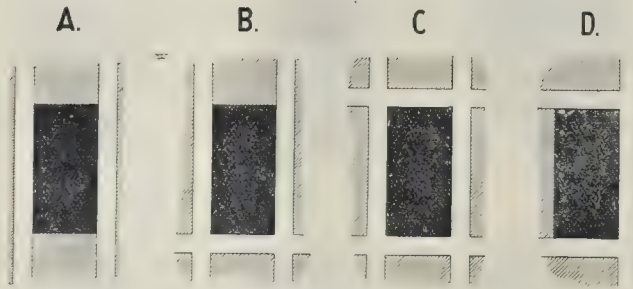
reached, but something very near it; and there were few buildings, old or new, that could be said to surpass the great Continental theatres of to-day.

**General.**—Proceeding to consider the plan and construction of the theatres of the Continent, Mr. Sachs continued:—Taken generally, Continental theatres are oblong in plan; in some cases the front is rounded, showing the outline of the auditorium, and in some instances there are wings on either side of the main block. (See comparative diagrams of block plans). The audience is always above the street level, and the building is always distinctly divided into two parts—the so-called front and back of the house. As the modern Continental stage requires great height, the grouping of the block generally shows this part of the building taken up separately as the prominent feature. There is seldom any attempt nowadays to put the whole of the building under one roof. The front of the house is generally distinctly palatial in feeling, whilst the back has always a thoroughly utilitarian look about it.

**Site.**—There are few modern theatres abroad that do not stand perfectly isolated. Public squares are the favourite sites. Isolation is

undoubtedly necessary where the maximum safety against the risks of panic and fire is desired, but I would point out that an audience can be well cared for if only two sides of the block face thoroughfares. Symmetrical planning is to my mind the first necessity for a theatre that is intended to be a safe one. The position of all passages and staircases on outside walls is the second essential, and the possibility of approach to every part of the building from outside is the third. Now all this is only possible where at least two sides of the block are perfectly free. To have the front of the site as well as the two sides looking on the thoroughfares is, of course, a great advantage, but to have the main front one side and the back open would be far worse than to have only the two sides free. Remember the plans of the Ring Theatre, the Exeter Theatre, and other scenes of fearful catastrophes. Legislators abroad require complete isolation, but I will not go so far for London. Our own by-laws, however, only say, "half the boundary open." That is not quite sufficient. The two sides of the building as seen when facing the stage must at least be free from end to end, and that generally means more than

## BACK.



## FRONT.

Diagram of Various Conditions of Site.

half the boundary. I am not going to dwell on the many technical advantages of isolation. The risks of panics, through accidents in neighbouring premises, the advantages of cleanliness, and the facilities for the working of the firemen in case of an emergency are points which should not be underrated. The safety of human life is a major interest, and the safety of property of minor consideration. As soon as the audience are out of the theatre, treat the building according to the custom of the country. It is not usual in this country to protect neighbours from one another to any appreciable extent, or to prevent a large risk that catches fire from being entirely gutted by enforcing such protective measures as those required by Continental Fire Acts. This may be wrong or right; I hold it to be wrong, but, in any case, why make an exception for theatre property? In a town where timber storage is allowed next to valuable warehouses, why protect, say, a public-house from the fire risk of a neighbouring stage? Abroad, of course, all this is different. The requirements for the isolation of theatres are no more stringent than the various measures in force for other classes of property.

The chief advantages of placing a theatre on an open square are the greater facilities for the approach and distribution of crowds, and easier manoeuvring for the fire brigade in case of need. Where buildings are really public institutions it greatly adds to their dignity to be well situated.

**Approaches, Entrances, and Exits.**—Great care is taken on the Continent to facilitate the approach of the audience. That part of the audience which arrives by carriage is nearly always able to enter the building under cover, without being disturbed by the inquisitive or having to feel the effects of inclement weather. Those who arrive on foot generally have numerous entrances from at least two sides of the building. Great care is taken abroad to avoid draughts by having double or even treble sets of swing-doors. Excepting in the grandest houses, all playgoers must pass the main vestibule, where the box-office is situated, and this also refers to the visitors who take unnumbered seats. Speaking generally, there are few seats abroad for which one cannot book in advance, and hence the number of tickets sold on the night of the performance is comparatively small. There are also very few unnumbered seats, so that the first-come-first-served system of procuring seats at the last moment does not allow the same scope to the energetic as in this country. If a queue has to be formed at all of an evening for tickets, the expectant of all classes generally pass the same counter to ask for whatever kind of seat they may require. Two counters to the same box-office is an exception, and separate box-offices for different parts of the house are only very rarely found. Where a queue has to be formed the crowd is generally well cared for and put under cover in an outer lobby or passage, and much attention is given to the arrangements of barriers, so that there need be no unnecessary fatigue.

The symmetrical planning of the Continent allows for the nominal division of the building into "The Right of the House" and "The Left of the House," as seen when facing the stage.

Tickets are issued for the right and left of the auditorium, and all passages and staircases will be found to be labelled on this principle. All passages and staircases can be used freely, and the visitor naturally takes the route which leads him quickest into his seat. Besides facilitating the finding of seats, the audience thus get to know the nearest exits at their disposal in case of an emergency. The system common in London, which only allows for one approach to each tier, whatever the number of exits may be, is radically wrong as far as the safety of the audience is concerned, although, no doubt, the theatre lessee will be able to run his house with a smaller staff of ticket-collectors this way. Though all staircases and passages are approached from the main vestibule, they all have separate exits leading direct into the open, without the vestibule having to be passed. In this way but few of the audience would pass the vestibule in case of a panic. Clear planning is favoured abroad as distinct from intricate and tricky planning, and this even at the cost of much valuable space. It is considered all-important that the dullest and most excited playgoer should have no difficulty in remembering the route by which he reached his seat.

**Passages.**—Among the chief features of Continental planning are the broad passages and corridors, and the fact that, with few exceptions, these passages run round the two sides and back of the auditorium. The Continental theatre-goer has generally to give up his wraps before taking his seat, and it is a favourite plan to provide long counters off the passages, behind which there is ample storage-room. The counters should, however, be recessed so that they do not obstruct the passages. I would here remark that the storage of hats and coats is very important for the safety of the audience. A wrap or a stick dropped during a panic may cause the first fatal stumble. Though it is difficult to regulate this matter, the prohibition has been enforced in several Continental countries, and where ample cloak-room accommodation has been provided the custom has generally become very popular. As to the actual storage of the apparel, the bin-system is the best. As to the cloak-room tickets, the plan of allowing a bin for each seat and then giving the bins the same numbers as the seats has been found very practical. Speaking of cloak-room accommodation, I may add that the ladies are by no means so particular abroad as to their retiring-rooms as in this country, and there is no objection to their being in a conspicuous position. The position of lavatories off main passages, which we would consider faulty, is hence also quite *en règle* abroad.

The passages generally have direct light and are well ventilated. This is essential for the audience to my mind. By opening or breaking the windows on the passage, the noxious gas and smoke which has been known to frequently find its way from a burning stage to the open doors of the auditorium can escape. A crowd will always feel safer as soon as it is near the open air, and in case of the lights going out, the window openings, even on a dark night, more especially if there are some lamps in the streets or courtyards without, will give some light, and with it more assurance.

Here I would at once suggest that where passages or staircases look on to the open, a few strong lights outside in no way connected with the service of the theatre will form the best kind of emergency lighting that can be provided. Of course, there must then not be any blinds or shutters.

**Staircases.**—The grand staircase, the great feature of the old Continental theatre, is gradually disappearing abroad, and where we yet find it its *raison d'être* is generally partly lost through there being quite sufficient staircase accommodation provided independent of its existence. The grand staircase is recognised as dangerous for the rapid exit of the crowd, as its pretension and architectural treatment generally necessitates arranging it in broad flights. Flights of staircases which allow more than four persons to ascend abreast create, as has been often explained, a danger of falling or stumbling. Of course there is the make-shift of a light iron railing running up the centre of a broad flight, and thus affording a hold, but I am afraid these iron bars will generally spoil the design of any staircase. At Copenhagen I constantly came across this class of railing, as the theatre regulations require the possibility of a hold for every person ascending stairs. They always looked atrocious.

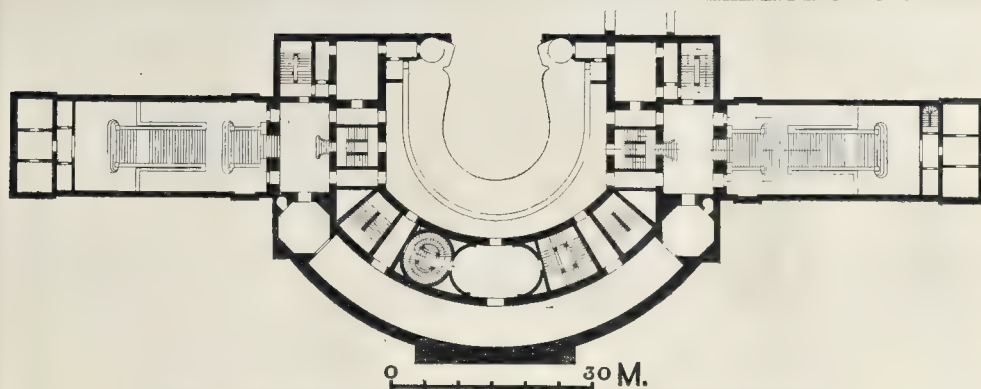
The Continental architect of to-day has three systems for the arrangement of his staircase: I will call them the central system, the radial system, and the corner system. The former allows of a grand central staircase, generally without direct light, or at the most a top light, and hence without the possibility of natural ventilation. On either side of this grand staircase the minor stairs are grouped. The Stockholm Theatre and the Frankfurt Opera House are examples of this system. The radial system allows of the arrangement of the staircases in a row, concentric with a back wall of the auditorium. The staircases to the first tier are then generally on either flank, and are frequently treated as minor grand staircases. The Hofburg Theatre and the St. Petersburg Opera House are examples of two variations of this system—the one with direct lighting, and the other without. The Lessing Theatre at Berlin is an example of the former system; the staircases are grouped on either side of the main vestibule, so as to have direct light. There is no grand staircase, and the stairs leading to the best seats only show a slightly superior architectural treatment. Staircases, in the same way as passages, should always have windows looking into the open. The advantages of the outside emergency lighting, as well as the other points to which I have referred when speaking of passages, hold good as regards the advantages of having staircases on outside walks.

Speaking from experience, I consider that the more persons in sight of one another in case of an emergency, the better the behaviour of the individual. I would hence suggest that, where possible, stairs should be so arranged as to allow a maximum view. I do not approve of the building up of surrounding walls of staircases in the way that limits the view. Being penned in and descending into a well, if I may call it so, creates a feeling of uneasiness.

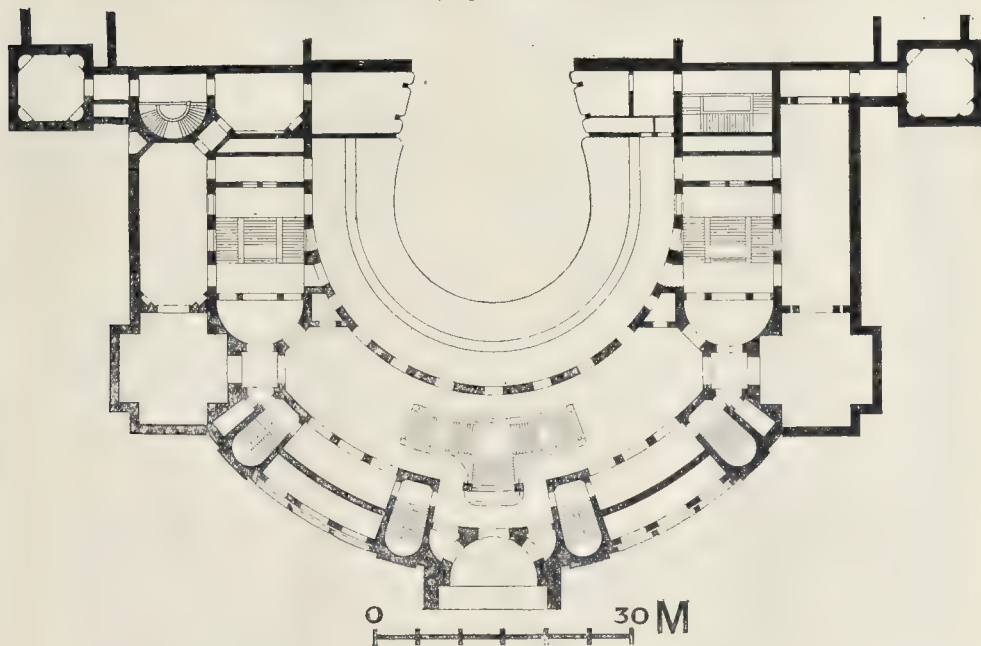
As an architect, I certainly much regret the disappearance of the grand staircase. This feature lends itself particularly well to an elaborate treatment. I hold it should be retained at any cost in the court and municipal theatres, which, as I explained, frequently serve as assembly-halls. There must, however, be sufficient staircase accommodation independent of the grand staircase, and no doubt some day a skilful architect will find some pleasing way of overcoming the dangers of broad flights. The radial system of staircases is rapidly gaining ground abroad, and I consider it the best for the quick distribution of an audience.

**Foyers, crush-rooms.**—Perhaps the feature of a modern Continental theatre is its foyer, or crush-room. We find what I will call the "Hall" foyer, the "Group of Rooms" foyer, and the "Promenade" foyer. The first is generally a spacious rectangular hall, situated over the main vestibule. It serves as the assembly-room for the patrons of the better seats, who stand about and that during the long *entr'actes* mostly allowed abroad. The hall is often used for the receptions I spoke of, and frequently also for concerts. No concert would, however, be given at the same time as the performance on the stage, as the staircase and passage accommodation would not be sufficient. Where there are groups of rooms, the smaller ones are, as a rule, provided with chairs and lounges arranged drawing-room fashion, whilst the larger one is used as a kind of miniature promenade, the visitors walking round in a





Plan of Auditorium and Staircases, Hofburg Theatre, Vienna.—Baron Harsznuer, Architect.



Plan of Auditorium and Staircases, St. Petersburg Opera House.—Professor Von Schroeter, Architect.

circle. This becomes very monotonous. *Foyers* arranged on these lines cannot well be used for concerts, but small receptions can, of course, be held in them. The Schwerin Theatre affords an example of the large "Hall" *foyer*. The Budapest Opera House shows a set of crush-rooms. The "Promenade" *foyer* is, to my mind, the most satisfactory one; it best fulfils the requirements of those who wish to easily stretch their limbs and meet their friends between the acts. A stroll will greatly refresh the playgoer, especially if he is attending a lengthy Wagner opera or a Shakesperian play. The stroll must, however, not be a monotonous one. There must be a change of scene. The long narrow *foyers* of the Paris or Vienna Opera Houses are very satisfactory, but the curved promenades of the Dresden Opera House, the Vienna Hofburg Theatre, or the Odessa Theatre stand first. The curved *foyers* goes hand-in-hand with the radial staircase system I spoke of. Most of the curved *foyers* have a roomy lobby at either end, where one can step aside for conversation or to watch the scene without creating a block. Speaking of the scene, I would here remark that in the countries I am speaking of the audience unfortunately is not, as a rule, in evening dress to see a play, not even the patrons of the best part of the house. This should be taken into consideration when decorating the *foyers*.

The *foyers* abroad nearly all have balconies or terraces connected with them, and these are much used in the summer. Doors from the *foyers* generally lead directly on to them, and the absence of any lobby has unfortunately caused many a chill. I consider the advantage of being able to step out into the open very great, and this not only for the refreshment of the audience, but also in case of emergencies. Great care should, however, be taken to prevent draughts. In court theatres there is often a small central balcony or open loggia. I spoke of royalty using their playhouse for ceremonies. It is necessary to have some suitable, prominent point from which any demonstration outside the building can be duly acknowledged.

I must now refer to the refreshment-rooms or bars in connexion with the crush-rooms. They are of the most harmless kind, and would even meet with Mrs. Ormiston Chant's full approval, as the contractor need generally only keep a good store of lemon-squash, ice-creams, and cake, to fully satisfy his customers. The liquor licence for the refreshment-room exists, but it is scarcely made use of. Light German beer can be had, but its consumption is comparatively small. The bar, as a rule, is generally only a kind of provisional table at the end of the crush-room, around which, perhaps, a few tables and chairs are arranged as in a confectioner's shop. There is

one thing I would here remark—I do not remember ever having seen refreshments served in the auditorium. If refreshment is wanted, the visitor is expected to leave his seat.

**Auditorium.**—The principal feature of a modern auditorium abroad is the absence of any boxes in our sense. The balcony arrangement has almost become universal, and though there are nominally boxes which allow parties of four, six, or more persons to form a group for themselves, they are not shut off pigeon-hole fashion as formerly. The ante-room for the box is also fast disappearing. The only boxes in our sense are generally the large open ones on either side of the proscenium, opening in the proscenium frame. These are generally reserved for dignitaries or distinguished strangers. The other so-called boxes are simply formed by dividing up the balconies with low partitions, and giving each division its own door. A compromise arrangement will be found in Semper's work. The partitions between his boxes are carried up, but are so cut away as to prevent the disadvantages of the pigeon-hole system without completely destroying all privacy.

When speaking of the arrangement of the auditorium abroad I must point out the ample seating and gangway accommodation provided and the great care that is always now taken to give every two or three rows of seats its own door.

Herr Seeling, I believe, shows the best example of safe seating in his Halle Theatre. Here I must just allude to the advantages of school-children learning to leave rooms on the "follow-my-leader" principle. Given a well-planned theatre, the instinctive exit of the audience on the lines they learnt as children would do much to ensure safety. I remember a notable demonstration of the advantages of follow-my-leader given by the late chief officer of the Berlin Fire Brigade, at one of the theatres in his city. He had the right half of the auditorium packed full with his men; we then went into a box and gave a signal for them to stampede. None of the men had been on the same ground before, but they were all used to leaving their dormitories smartly and running down the staircases at their fire stations in good order. It just took eighteen seconds to clear out about four or five hundred men. The same experiment was tried with 1,400 school-children at the Worms Theatre, and I hear they were out of the auditorium in forty seconds.\*

Referring to the construction of the auditorium, I would only point out that there is no such excellent cantilever work abroad as is to be found in our Palace of Varieties. The latest development of iron and steel construction abroad shows the surrounding wall of the auditorium entirely of girders and plates. This is on account of the large number of flues and ducts that have to be found room for in Continental theatres. If you will examine the work in the drawings of the Hofburg Theatre, you will find an example of this system. Of course, if an auditorium of this construction ever does get well alight, it means the immediate collapse of the whole structure.

As to the architectural treatment of the auditorium, the ceilings are no longer designed so as to appear to be resting on nothing, but are visibly carried, preferably by caryatides. The heavy columns in the French theatres are things of the past; almost invisible steel pencil columns without any architectural treatment are generally used where supports are necessary. The decorator and upholsterer are no longer permitted to use the stereotype red-and-gold; blues and rich yellows are finding favour in the upholstery, and white, picked out with gold, for the walls and cornices. The ceilings are kept quite light, preferably white, picked out to match the upholstery. As to the furniture, the tip-up seat with a small side-arm has almost become universal. It is well-padded in the better parts of the house, but a bent wood is a favourite for the cheaper seats. As the buildings abroad are only licensed to hold a certain number of seats, and this condition is very stringently enforced, benches which can be crowded are of no use to the manager, even in the cheap parts of his building. As I said, hats and coats are mostly left outside, so that no provision need be made for these. As to the numbering of seats, it is always in plain block letters, odd and even numbers to the left and right of the house respectively.

**Orchestra.**—As to the orchestra, of course the dimensions and position varies greatly, according to circumstances. A small dramatic house I once noticed had a string orchestra stowed away behind a grille in one of the upper boxes at the side of the proscenium. These upper boxes are generally almost valueless to the manager, and hidden music is certainly always very fascinating. The grille should be of bamboo; iron gratings would affect the tone of the music.

Well, to return to the orchestra, we generally find it in its usual place abroad just in front of the stage, though generally sunk deeper into the floor than in England. Wagner always made a point of having a sunk orchestra for his operas, and he built one on these lines in his Bayreuth Theatre. What is good for Wagner's music does not, however, hold good for a light opera by Strauss or Sullivan, and hence the new invention abroad of a movable orchestral floor regulated by hydraulics. The first movable floor was completed last month at the new Wiesbaden Theatre. Of course there was much witticism as to the new arrangement, and during rehearsal a wag even pulled one of the levers, so that the whole orchestra bodily rose whilst attempting to play a passage with a gradual crescendo. A spectator tells me the situation was rather comic. The idea of the movable

orchestra is, however, very good, and there is little doubt that it will soon be introduced in all theatres which have the great variety of programmes I explained. Most orchestral wells abroad can, of course, be made larger or smaller to suit special requirements. An extra row of stalls is either put in or left out. Great care is taken to provide good exits for the orchestra, and no connexion between the stage mezzanine and the orchestral well is allowed. It is necessary that the orchestra should be quite at ease as to its facilities, for by continuing to play, whatever may be happening on the stage, panics can be prevented.

**Safety.**—To my mind, as I said before, life is of major importance, and the building of minor consideration, and this especially holds good in this country, where losses by fire count for nothing, and fires are even considered to be good for trade. Where life is the only consideration, perfect means of exit in case of panic comes first, and then the reduction of the risk of panic caused by fire, by good lighting and warming appliances, cleanliness, careful stage management, slow combustion stage plant, and, perhaps, the isolation of the building. As long as the staircases are well-planned, they can be of wood. Fire extinguishing apparatus is almost superfluous. If the property is to be saved, the building must be divided into a number of "risks," both horizontally and vertically; it should be built of slow combustion materials; should have its own well-manned fire-extinguishing appliances, and not be too far from organised outside help. Whatever care be taken to save the audience, it will, however, not count for much if they cannot help themselves by keeping their heads, and likewise whatever is done for the building is but little compared to the advantages of the manager and his employees being practical men who are cool in all emergencies. An authority, asked at a Parliamentary Committee of Inquiry to explain London's immunity from theatre catastrophes, simply put it down to "luck." Nothing of the kind. Our immunity from catastrophes is due to the average Londoner's temperament and the clear-headedness of our workmen. The little fire we saw at a first-night, not many weeks ago, close to the Strand would have caused a stampede in France or Italy. I remember seeing an audience up and partly off in panic on account of a few sparks off an electric contact in the auditorium. A lime-light accident as we had it at another theatre last winter would, I regret to say, have made almost any Continental stage-carpenter leave his post. Our stage-carpenter's pluck and smartness, his cap and coat, have saved hundreds of lives that must necessarily have been lost if we had a panic in one of our mouse-traps. Our sportsmen and athletes, who are at the most amused if something goes wrong on the stage, and our young ladies, who seem to keep their heads better in emergencies than those of any other country, have almost saved as many. You will, perhaps, ask how I account for Germany's immunity. It is not clear-headedness there, but simply the continual careful, plodding fire-survey, and the custom of having strong fire-watches of the picked men of the city fire-brigade on the stage which prevents catastrophes. The German stage-carpenter is not a smart man, and the audiences easily take fright.

**Stage.**—The most remarkable features of the Continental stage are its appliances. Stage-mechanics is being treated as a science. Capable, scientifically-trained engineers replace the stage-carpenter of old. The only wood to be found on or about the modern stage is generally in the stage floor, and here hard oak or teak is used. The reform is a *bona-fide* one; not merely an adaptation of the old stage to suit modern requirements. The monstrosity of rows of "flies," and footlights which throw their glare upwards on to the actor's chin, instead of downwards on to his forehead, is gradually being done away with. The streak of limelight that used to follow the actor about will soon be forgotten. We have to thank Professor Herkomer, R.A., for the two valuable illustrations showing what I will term "reverse" lighting. Professor Herkomer, who is an expert in scenic art, had the drawings prepared for a lecture he gave on the subject some two years back. There are two systems of *mise-en-scène*, one, if I may call it so, requiring a possible imitation of nature, the other attempting the simplest indication of general surroundings. For the imitation of nature, the so-called "horizon," the careful grouping and the rational method of lighting, are as essential as the scene-painter's handiwork. For the indication of surroundings all attempt at perspective should be avoided. A

well-painted background and monochrome drapery, instead of "flies," will suffice. The skill of the first-class engineer will of course only be required where the hydraulics and electricity at his disposal he will be able to supply every want of the artist, and this without any cumbersome crowding of the stage with all manner of platforms and supports. It is impossible for me to-night to enter into a description of modern stage-appliances. I would only remark that the system of the Vienna "Asphelcia" Company, the first attempt at entire reform, is gradually being improved upon. The great reformers of the modern Continental stage are the engineers, Messrs. Brendt (Berlin), Christofani (Budapest), Brettschneider (Vienna), Lautenschlager (Munich), Richter (Darmstadt), and Rudolph (Vienna). As far as the risk of panic and fire is concerned, the iron stage does not, perhaps, have quite as many advantages as are generally ascribed to it. The canvas scenery always remains, and if it does commence to burn the heat engendered will soon destroy everything, and probably the iron roof first. I show a photograph of a fire at a panorama I was at in Vienna. The one large canvas-sheet which caught fire almost immediately destroyed the roof. Canvas burns terribly rapidly and fiercely. Electric lighting is, of course, a great improvement as far as safety is concerned, but absolute reliance on immunity from fire on account of its introduction would be reckless indeed. Some authorities I know consider an iron stage lighted by electricity practically safe. At Warsaw, for instance, I visited the old Opera House, which was being renovated regardless of expense, and found that the architect had purposely not allowed for an iron curtain on account of the electric light and modern stage machinery. Of the disadvantages of iron stages let me mention their effect on the acoustics of the building, the difficulty of giving the stage a comfortable temperature in winter time, and, further, the greater risk of accidents to the employees. To improve the acoustics the top of the stage is generally kept full of canvas, and this, of course, means an extra risk. Sprinklers, for instance, cannot be as effective where the streams of water are constantly blocked by rolls of canvas.

This brings me to the protection of the stage itself. The case of a fire having broken out. Abroad, reliance is almost entirely placed on the firemen with their buckets of water and hydrants close at hand. Next come the sprinklers. The ventilation flue over the stage, and the great divisional iron curtain, are to prevent the spread of fire in the direction of the auditorium. Hydrants, with good reliable pressure and hose and branch attached ready to be run out, are always provided in the Continental theatre in great number, and I would here remark that the cock can generally be opened with one movement only. Of course, the firemen belong to the local brigade and stand under municipal officers. Sprinklers are very common abroad in the new theatres. I had little faith in them for theatre risks until May last, when I saw them tried at the Budapest Opera House. The stage was literally flooded, and the deluge was sufficiently formidable to swamp the largest fire. The rows of sprinklers are generally divided into sections abroad, so that if necessary the force can be localised to one particular spot, and the danger of unnecessary water damage avoided. The ventilation flue, which is nearly everywhere found over the stage, and can be easily opened, is considered a safeguard for the audience in the case of hydrants and sprinklers failing. The smoke and the fumes will be drawn away from the auditorium. The danger of having ventilators is the possibility of their being opened too soon; say before any water has been brought to play on the fire; the flames would then be fanned and the spread facilitated. The divisional curtains are everywhere introduced abroad, and at present the only question ever raised is as to the advisability of having double curtains either in form of second asbestos-protector or a water-sheet. Without a ventilation flue over the stage the curtain will be pressed into the auditorium by the expansion of air on the stage. To my mind it is almost useless to lower a curtain without having this flue. It is true that I have not seen a curtain "blown out," but experiments were made at Vienna with a model of the unfortunate Ring Theatre, and the "blowing-out" repeatedly followed within about twenty seconds of the fire obtaining a hold.

**Stores and Dressing-rooms.**—The only thing remarkable about the stores abroad is the ample space allowed both where the main stores are in

\* We are very glad to find that this practical idea of teaching people how to get out of a building is receiving attention in Germany, though it is entirely ignored here. Some years ago, after a catastrophe arising from panic, we pointed out that if an audience, when fire rendered it necessary for them to quit a building, would have the sense and self-command to file out in order, and march down stairs two abreast like a column of soldiers, they could all be in the street in two minutes without any crushing at all. But the only thanks we saw given for this advice consisted in the receipt of an abusive anonymous postcard.—Ed.



the same block as in the audience, and where there is only a secondary store, and the main storage is outside the building. Where main stores are inside there is always a double wall, some 4 ft. apart, between the stage and the stores to prevent spread. In some cities the main stores have to be outside the building. This, of course, means much wear and tear and extra labour for the management. The St. Petersburg and the Paris theatres have very extensive buildings for storage purposes only.

Dressing-rooms are generally well-arranged on the Continent, but the absence of bath-rooms is remarkable. The lavatory accommodation does not come up to our requirements. One thing has always been forgotten in Continental dressing-rooms as regards the safety of the *employés*, and this is the proper arrangements for heating curling-irons and paint-warmers, though very practical electric appliances have been invented. I should recommend the necessary electric appliances for curling-irons and paint to be provided as fixtures.

*A People's Theatre.*—I must close with a few remarks on a people's theatre. You see the drawings of the Worms Theatre, built from the designs of Herr March, of Berlin.\* When the building was put up, Worms had as many as 23,000 inhabitants, that is to say, as many as Winchester or Reigate of our provincial towns, or Gravesend and Richmond of our London suburbs. Worms wanted a theatre. Everybody in the town was ready to subscribe, and the Town Council also found that a little money could be taken from the rates. Everyone was satisfied if the play-bill were limited to drama, and it was immaterial if they were put on to the stage with a full *mise-en-scène* or only the indication of the surroundings I referred to. There is a good deal of democratic spirit in Worms, and hence a distinct division of an audience into sections would not have pleased the inhabitants. The best men of the town were to have the best seats, but they were not to be isolated. An assembly-hall was also required in the town, and as a combination of the two buildings meant a saving both of the initial outlay and the maintenance, a block not dissimilar to those of the national societies I spoke of was decided on. The plans explained themselves. The Bayreuth system of seating was adopted, the lines only being more curved, which does not make it so oppressive for an audience as in the Wagner buildings. The best seats were in the Wagner position. All use the same entrances, the same lobbies, and the same cloak-rooms. The best seat costs 2s. 6d., and the front rows, which are rightly considered to be the worst, 6d. For chamber-drama the stage is used with a simple indication of the surroundings; for grand drama there is a full *mise-en-scène*. The stage has a depth of 27 ft., and its width is 48 ft. These dimensions will be found to be between those of our Daly and Haymarket stages. There is no orchestra wall. An organ has been placed at the back of the auditorium, where there is also room for a band, or even a choir if necessary. Exclusive of the seating accommodation in the gallery, there is room for an audience of 1,200, or with it, for 1,400. The auditorium already looks well filled with an audience of about 800 or 900. Again, I cannot go into detail, but I would mention that the audience has thirty-three exits at its disposal, and that the auditorium has a large central top light, so that the hall can be used for public meetings in the daytime, and the cleaning is greatly facilitated.

As to the cost, the whole establishment, theatre, assembly-hall, restaurant, and grounds, with all necessary furniture, fixtures, and sufficient supply of scenery to start the management, would cost just 610,000 marks, or 30,500*l.*, which, with the prices of labour and materials in this country, and the higher value of ground, would mean 40,000*l.* The 30,000*l.* were collected as follows: first there was mortgage money to the extent of 7,500*l.* on the property, lent by the Municipal Bank at  $3\frac{1}{2}$  per cent. The interest for this mortgage can be easily covered by the refreshment contractor's rentals, who has the monopoly of catering in the place. Then, 11,500*l.* were collected by voluntary subscription; 5,000*l.* were allowed by the Town Council, and the remaining sum made up of the proceeds of bazaars, lotteries, and such-like amusements. The Town Council undertook the maintenance of the property.

May I ask, in conclusion, if municipal subscription and people's theatres should not be encouraged by architects as buildings which lend

themselves to architectural treatment in the best sense? and can we structurally improve upon our private theatres of to-day by studying what has been done abroad under different circumstances?

The paper was illustrated by a great number of views, elevations, and plans of Continental theatres, which the author must have been at great trouble to get together, and which formed an exceedingly interesting collection.

The Chairman, in inviting discussion, said that the only two modern English theatres possessing architectural merit which occurred to him were the Palace Theatre in Shaftesbury-avenue, and the Memorial Theatre at Stratford-on-Avon. He supposed, therefore, that Mr. Sachs was right in his contention that the theatre-builders of this country did not require art, but simply decoration, and the aid of the fibrous-plaster people. There were a great many present that evening who might be considered experts on the subject of theatres, and amongst them he saw Mr. Roberts, the Chairman of the Theatre Committee of the London County Council.

Mr. Roberts said he wished to thank Mr. Sachs for his interesting paper, and especially for the information it contained on a topic which was rapidly coming into the front of practical municipal politics. He had been for several years in favour of the municipal theatre, which was very desirable, both from the people's and from the architectural point of view. He questioned, however, whether, at the moment, the English people were sufficiently educated for the municipal theatre, and he rather agreed that they were not an artistic people, though he believed they would, in future, become greater theatre-goers than they had been in the past. He believed that Art, of necessity, must be endowed, and he would like to see a municipal theatre, with a school of dramatic art attached; indeed, it was quite possible that the Technical Education Board of the London County Council might subsidise such a scheme. Dramatic art, without some subsidy, would not succeed in this country, and the difficulty the County Council occasionally had with regard to the structure of theatres was that of *£.s.d.* Every English actor seemed to be anxious to be a lessee, and to have his own theatre and company. The actor had first of all his art, but the structure was to him a secondary consideration, so that it frequently happened they had to ask theatre-owners to spend more money on their structures than they could well afford. The way to get over all this was to have a municipal theatre, subsidised by the Municipality or the State. As a member of the London County Council, he wished to affirm that they had no objection to dramatic art as such, but would rather like to see it encouraged. They must, first of all, consider that the first object should be the safety of the public. At the same time, he did not wish to look upon theatres as places to be burnt, but rather as places of public amusement and recreation, and whatever its construction and site might be, the safety of the theatre rested principally on the absolute watchfulness exercised over the building. The London County Council were anxious to encourage the erection of theatres, though, no doubt, the difficulties in London were very great, and the sites were expensive. He would have been glad if it had been possible to adopt a proposal, which he had strongly supported in the Council, that every theatre should be perfectly isolated. They were unable, however, to carry that out, but they adopted the suggestion that half of the boundary should abut upon thoroughfares. Mr. Sachs had told them that was not sufficient. The proprietors of London theatres felt very keenly the expense to which they occasionally were put with regard to the structures, and the only possible way to relieve them of that expense was by having a municipal theatre, built in a manner worthy of the municipality, put on the same footing as free libraries, and rate-supported, which would be a credit to London and to the architectural profession.

Mr. Mulholland (of the Camberwell Theatre) thought it would be a consummation devoutly to be wished if they could see municipal theatres in their midst. It would give the dramatic art that official countenance and position to which it had hardly attained in this country. At the same time, he did not consider it would foster dramatic art to the extent its supporters seemed to imagine. There was something of the sort in certain provincial towns, where theatres were built by a syndicate, the majority of whose members were on the Municipal Boards, and his experience was that there were

about the worst-managed theatres in the country. Then, again, where one mind dominated the management of municipal theatres, an artistic and commercial failure was the general result.

Mr. Leon said that, though a member of the Theatrical Committee of the London County Council, he did not feel competent to speak on the architectural necessities of the theatre. As to having a municipal theatre, he was afraid that many people who were opposed to theatres would object to pay the necessary rates. He would like to have the opinion of the experts present as to the safety of employing iron doors.

Mr. Thomas Blashill complimented Mr. Sachs on his interesting paper, and for the excellent display of plans upon the walls. It was a remarkable fact that there was hardly a little town in Germany which did not possess one or more theatres which were absolutely isolated. The kind of sites that came before the County Council would astonish his hearers; any piece of ground which touched thoroughfares in two places, though otherwise useless, being deemed good enough for a theatre site. He would venture to advise the young architect in designing his theatre, to commence first with the staircases and passages, so as to see if they were ample, and that there was land to spare for the theatre. With respect to the question of stores, he had seen the whole space underneath the whole stage packed with scenery, while abroad, at the rear of most of the important theatres, could be seen a long sloping road leading up to the back of the stage, for conveying the scenery to and from the store-places close at hand. The County Council had great difficulty in ensuring that the exits should always be used, and it was very dangerous to have an exit door that could not be opened from the inside. Not long since he happened to be passing a theatre between 9 and 10 o'clock in the evening. He was aware that there were means for locking the self-acting bolts there, so that he went and inspected them, and found they were fast. On going into the theatre and mentioning the matter to the manager, that personage said, "I have the key in my pocket, and was just going to send round and have them opened!" Now, if anything had happened that evening the staircases would have been blocked up with the people. He did not agree with Mr. Sachs as to letting people in at several doors; what was wanted was one tier one entrance. The question had been asked as to whether a changeable or a permanent body should have the supervision of theatres. Abroad, so far as he knew, these things were managed by the police, and the first regulation they would make would be that there should be a 40 ft. street round every theatre. Then, again, the theatre manager would be compelled to find accommodation and wages for half-a-dozen firemen, while a variety of other restrictions would be imposed upon him, which nobody would prefer to the present ones.

Mr. W. D. Caroe remarked that the value of sites in Germany was not so great as in London. There was much more to be done in adapting the theatre to the site than in laying down a hard-and-fast line that no theatre should be built which was not entirely isolated. It had been said that the London theatres were the best which could be constructed for the money expended on them. He would like to say from their point of view as artists that in some of these theatres could be seen costly gilding, gawgaws, and upholstery, while if a little real art and quietness were introduced the result would be very much better, and attained at much less cost.

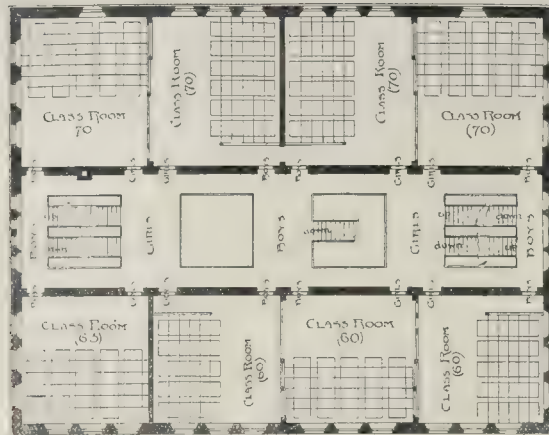
The Chairman said that Mr. Caroe had taken out of his mouth the one remark he had intended to make. He was afraid that Mr. Mulholland, in common with the British public, regarded Architecture as meaning a profusion of ornament and consequent expense. He would like, however, to tell Mr. Mulholland, as representing the managers of London, that good architecture generally meant very little ornament indeed. He wished to express the thanks of the members to Mr. Roberts, Mr. Leon, and Mr. Mulholland for coming amongst them that evening.

The vote of thanks to Mr. Sachs was then put, and was very heartily received.

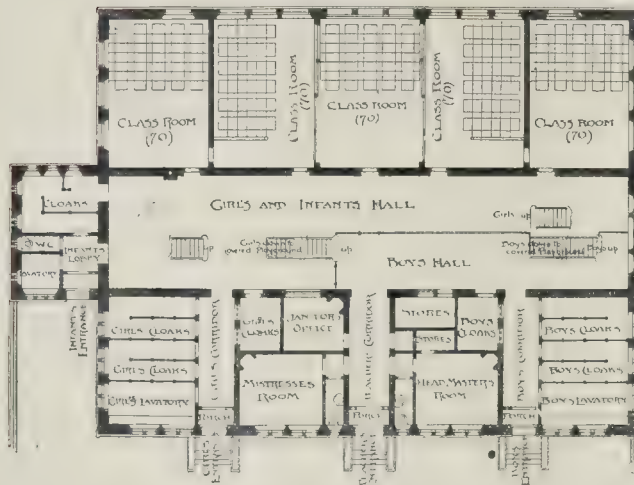
Mr. Sachs, in replying, said that Mr. Roberts had spoken of having a municipal dramatic school, but he was not aware of such a school existing abroad under municipal subsidy. Court theatres sometimes had dramatic schools, and of these he would mention the Czár's Theatrical College at St. Petersburg, where there were 125 pupils. Referring to Mr. Mulholland's suggestion as to the interference of committees, Mr. Sachs said that, as a rule, he had found abroad

\* See lithograph illustration in this number.—Ed.





Plan of First Floor (a Mezzanine Floor is interposed between this and ground floor, with additional cloak-rooms, &c.).



PLAN OF GROUND FLOOR:

Competition Design for Craighall School, Leith.—Plans.

that, when the lessee or manager had once been engaged by a municipal authority, he was allowed to do pretty well what he liked. His engagement was usually for a three or seven years' term, and it was only at the end of the term that he appeared before his inquirers. As to Mr. Leon's remarks on iron doors, to his mind such doors were very bad indeed. An oak door, covered with sheet-iron, and perhaps a layer of asbestos underneath, was better than an iron door, the disadvantage of which was that it would bend in some direction, however well it was hung. As to Mr. Blaschill's remarks on stores, the regulation abroad as to scenery was, that not more than sufficient for two plays should be kept in the theatre. In closing, Mr. Sachs remarked that if permanent authorities were to rule the theatres of this country, we might, of course, expect more despotic ways. Where individuals ruled abroad they were always afraid of being "hung."

The proceedings then terminated.

TO CORRESPONDENTS.—Letters of any length, intended for publication in the *Builder*, should be sent, when possible, rather early in the week. A long letter sent at the last moment (*i.e.*, Thursday morning) is often unavoidably excluded or postponed because the available space is already filled up.

## Illustrations.

### PEOPLE'S THEATRE, WORMS.

THE Worms Theatre is the latest outcome of the "subscription" establishments mentioned in Mr. Sachs's paper on Continental Theatres (see page 428). As will be seen from the plan, the block stands in its own grounds, part of which is used as a beer-garden in connexion with the assembly-hall and restaurant. The site has a frontage of about 350 ft., and a depth of about 220 ft. Quite half the superficial area is covered by the theatre proper.

In designing the building, Herr Otto March, the architect, studied Wagner's Bayreuth Theatre, and the model playhouse proposed by Messrs. Davidoud & Boardais, of Paris. The results, as far as the general practical arrangements and the "sighting" and acoustic properties of the auditorium are concerned, have certainly been very satisfactory, so that the promoters, as well as their architect, may well be congratulated on the successful realisation of their suggestions. The plan explains itself, and we would only point out that the lavatory accommodation does not seem sufficient for an audience of 1,400, whilst the position of the ladies' retiring-room, though

this may be thought satisfactory abroad, is much too conspicuous off the main passage. The same remark applies to the Assembly Hall, which is about 70 ft. long, and has the door of the ladies' room at the further end, next to the stage, in the most conspicuous position possible.

Worms, a town of about the size of Winchester, is a very progressive place. Nearly 100,000 are being spent on a harbour and embankments for river traffic, new Municipal Gasworks were lately erected at the cost of 25,000*l.*; and the Municipal Waterworks, constructed at a cost of about 60,000*l.* This is very remarkable, and we should like to know what the rates are. That a town of this size can also afford to raise two-thirds of the 30,000*l.* for their new theatre, by voluntary subscription, seems only to be another proof that the flaunted impecuniosity of the German is rapidly becoming a thing of the past.

### COMPETITION DESIGN FOR PROPOSED NEW SCHOOL AT CRAIGHALL-ROAD, LEITH.

THIS was a competition design. Seats were required for 1,400 children, together with large play-sheds in the basement. From the main street separate entrances for the boys and girls were provided, overlooked by the head master's and mistress's rooms respectively. Each standard had its separate cloak-room on either the ground or mezzanine floors, and the staircases and class-rooms were so arranged that each class-room should have two doors communicating directly with the boys' and girls' lobbies and staircases, so that in all the routes of communication throughout the entire building the sexes should be absolutely separated, except in the class-room, where in Scotland boys and girls are taught together. In the mezzanine were placed the male and female assistant teachers' rooms, commanding respectively the boys' and girls' cloak-room on this floor. For the external work the materials proposed were Craighall stone for the walls and red tiles for the roofs. The elevations show three blocks of buildings, the staircases and halls being covered by a subordinate roof in the centre, while the class-rooms at front and back show high roofs with gabled ends. The windows of the various fronts were arranged in groups of three lights each. The estimated cost was about 10,000*l.* MORRIS & HUNTER.

### STABLES, BICKLEY PARK.

THE stables here illustrated are in Bickley Park, Kent, and were built for Mr. J. Wythes, by Messrs. Arnaud & Son, of Bromley, Kent, from the designs of Mr. Ernest Newton, the architect.

The stable fittings were by Messrs. Musgrave, and the clock by Messrs. Gillett & Bland, of Croydon.

The bricks and tiles are red hand-made Wrotham, the stone Portland, and the woodwork of cow-stable, covered yard, &c., English oak. The paving of courtyard is in small granite cubes, with a broad red-brick path all round.

The drawing (trees and all) is as exact as a photograph. E. N.

### MISCELLANEOUS SHEET OF ILLUSTRATIONS.

THE drawings illustrated on this sheet were all hung in the Architectural Room at the Royal Academy this year:—

#### HILL WOOTON, WARWICKSHIRE.

THIS small drawing is a sketch of the house seen from the stables. The architect is Mr. R. Morley Horder, of London; and builder, Mr. R. Bowen, of Leamington.

#### COMPETITION DESIGN FOR DARLINGTON MUNICIPAL BUILDINGS.

THIS design, submitted in competition for the above buildings, was planned so as to get the whole of the offices on the ground and sub-ground floors, the first floor being reserved for the council chamber, with committee rooms, the mayor's parlour and reception-room, and the large public hall. One of the main features of the plan is the grand staircase, serving both for the purposes of the council, and for the large hall, instead of having separate staircases, as is most usual.

The large hall (which has no gallery), will hold over one thousand people.

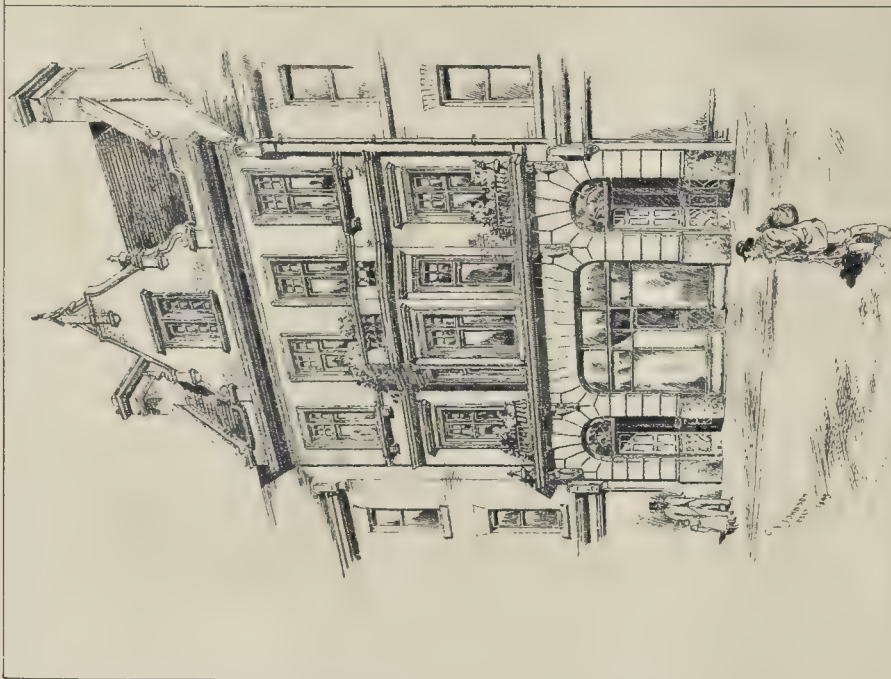
The building was to be faced with a local stone, and the roofs covered with green Westmoreland slates. ARTHUR S. JONES.

#### ENTRANCE HALL AND STAIRCASE.

IN this design the hall is intended for general use as a sitting-room, and is in direct communication with all the principal reception-rooms of the house, and also with the domestic offices, through the arch at end of room, the lobby and entrance.







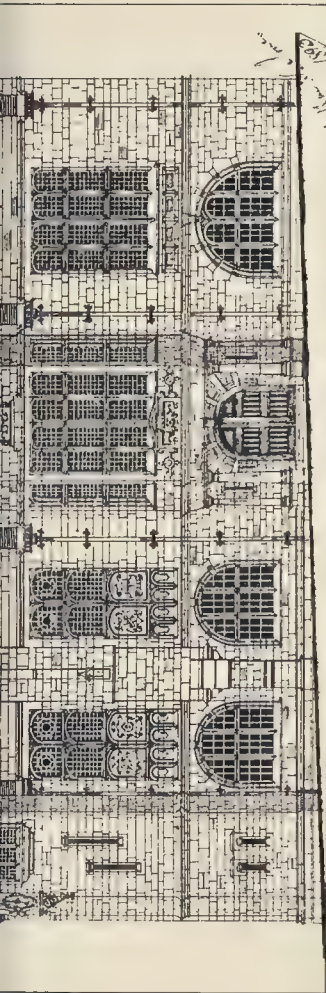
PROPOSED NEW PREMISES, KINGSLAND.—MR. C. V. JOHNSON, ARCHITECT



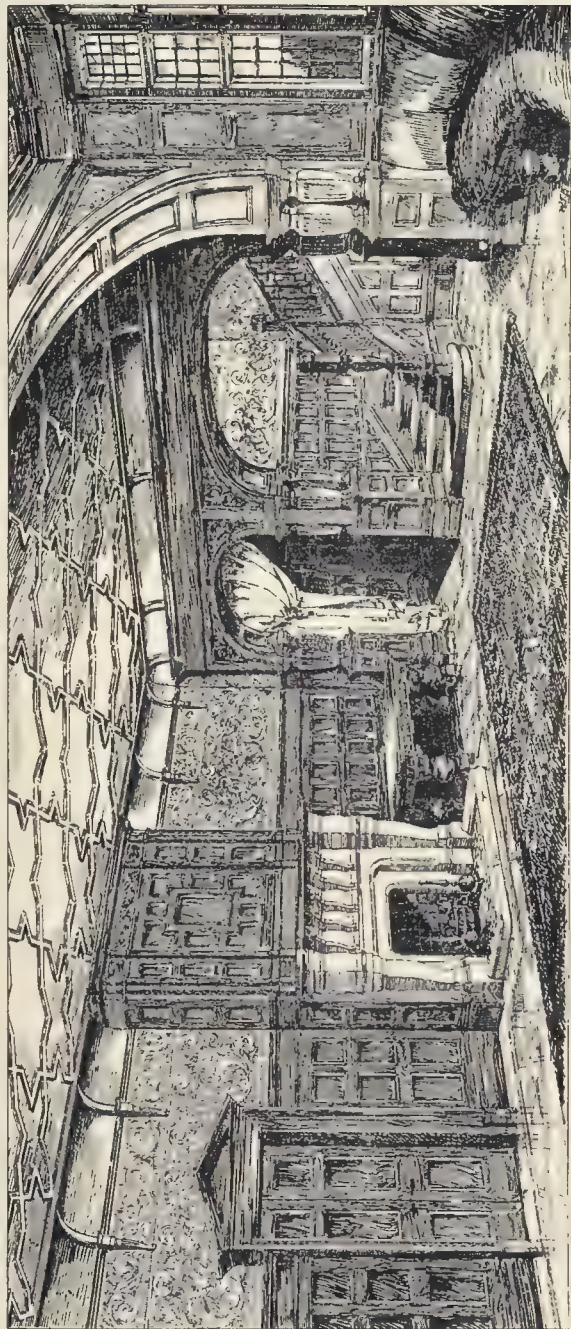
"HILL WOOTON," WARWICKSHIRE. MR. P. MORLEY HORDER, ARCHITECT.







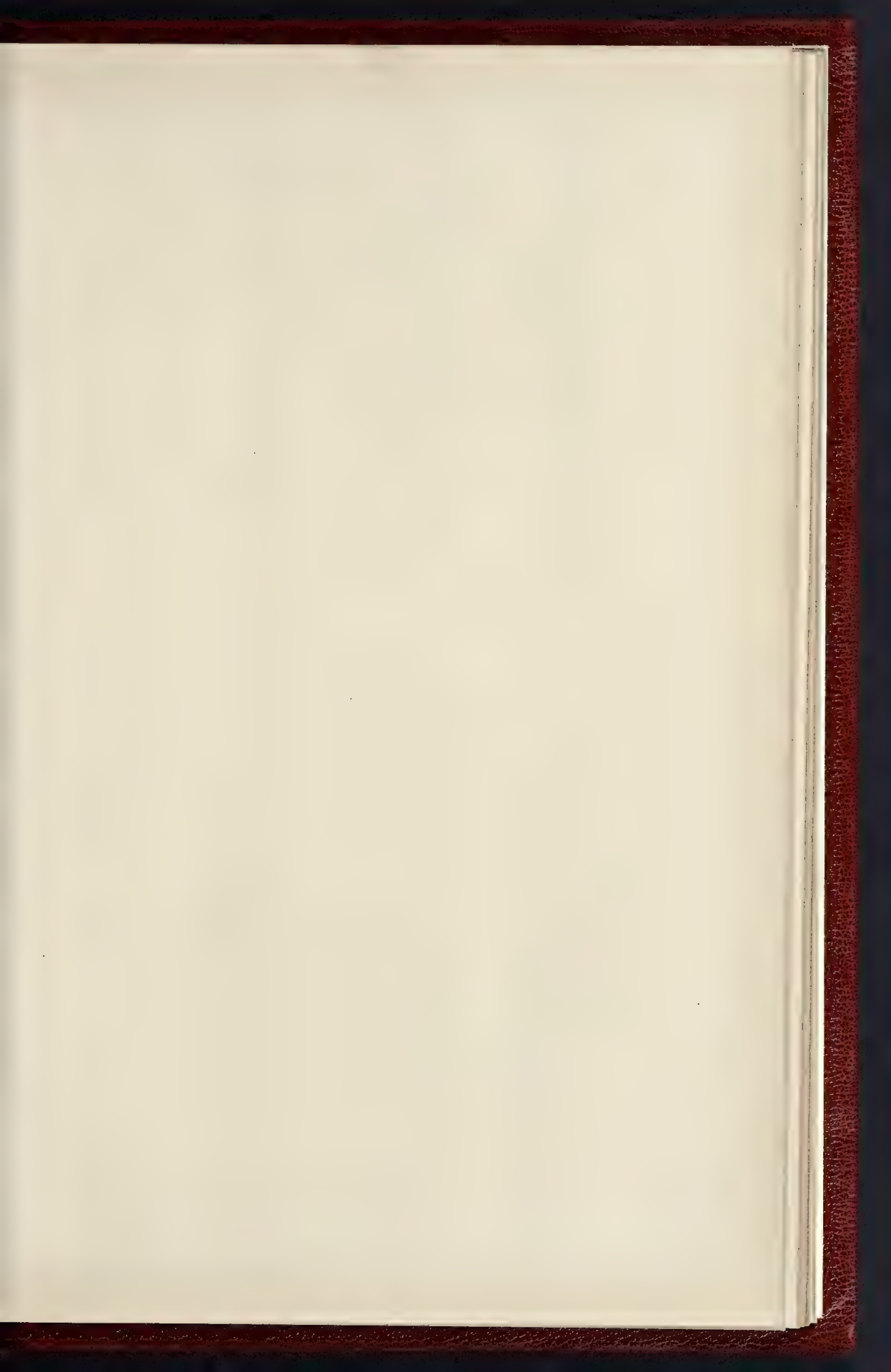
COMPETITION DESIGN FOR DARLINGTON MUNICIPAL BUILDINGS—By MR. ARTHUR S. JONES, A.R.I.B.A.

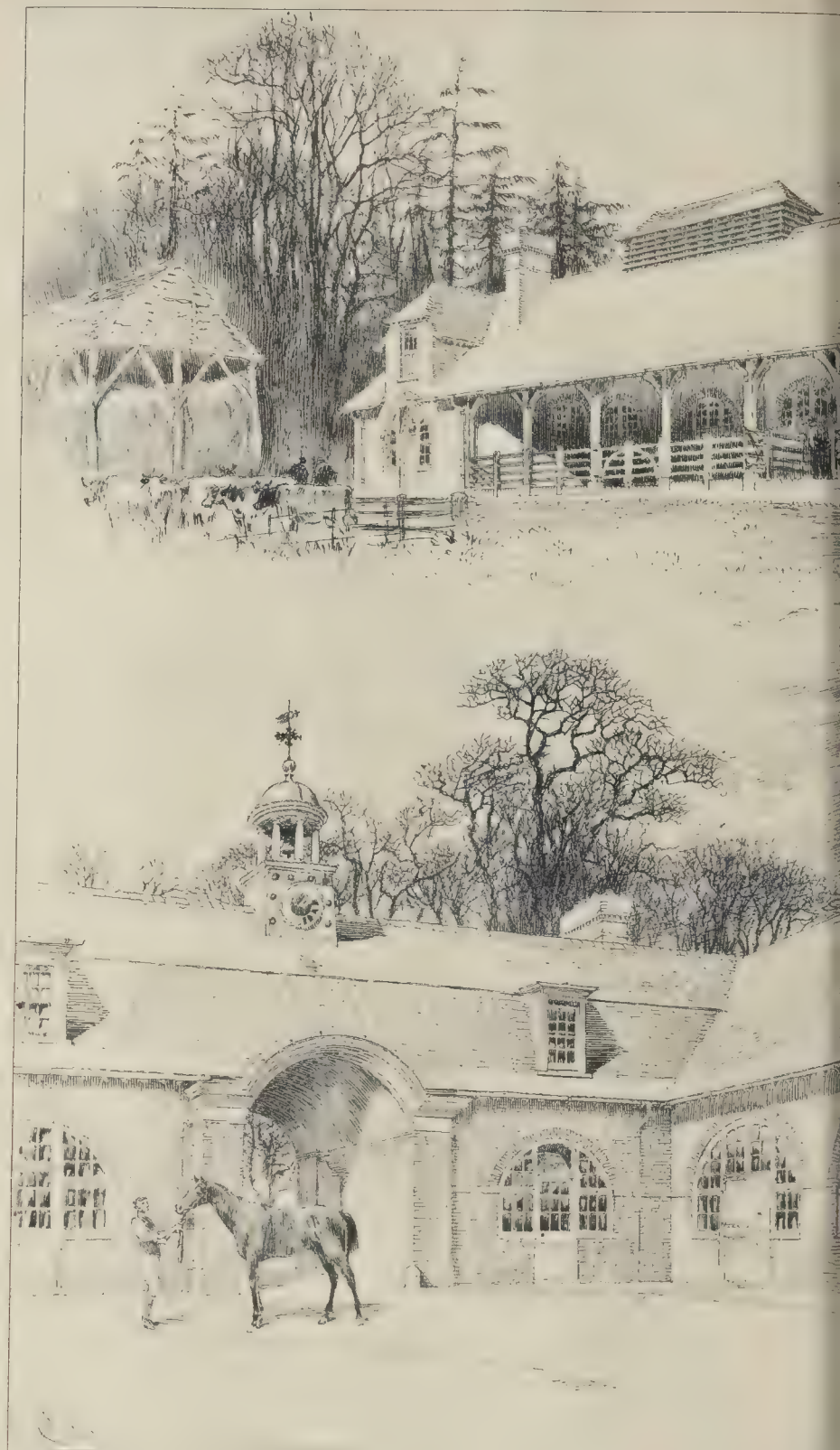


DESIGN FOR STAIRCASE AND ENTRANCE HALL—By MR. WILLIAM T. BARLOW, A.R.I.B.A.









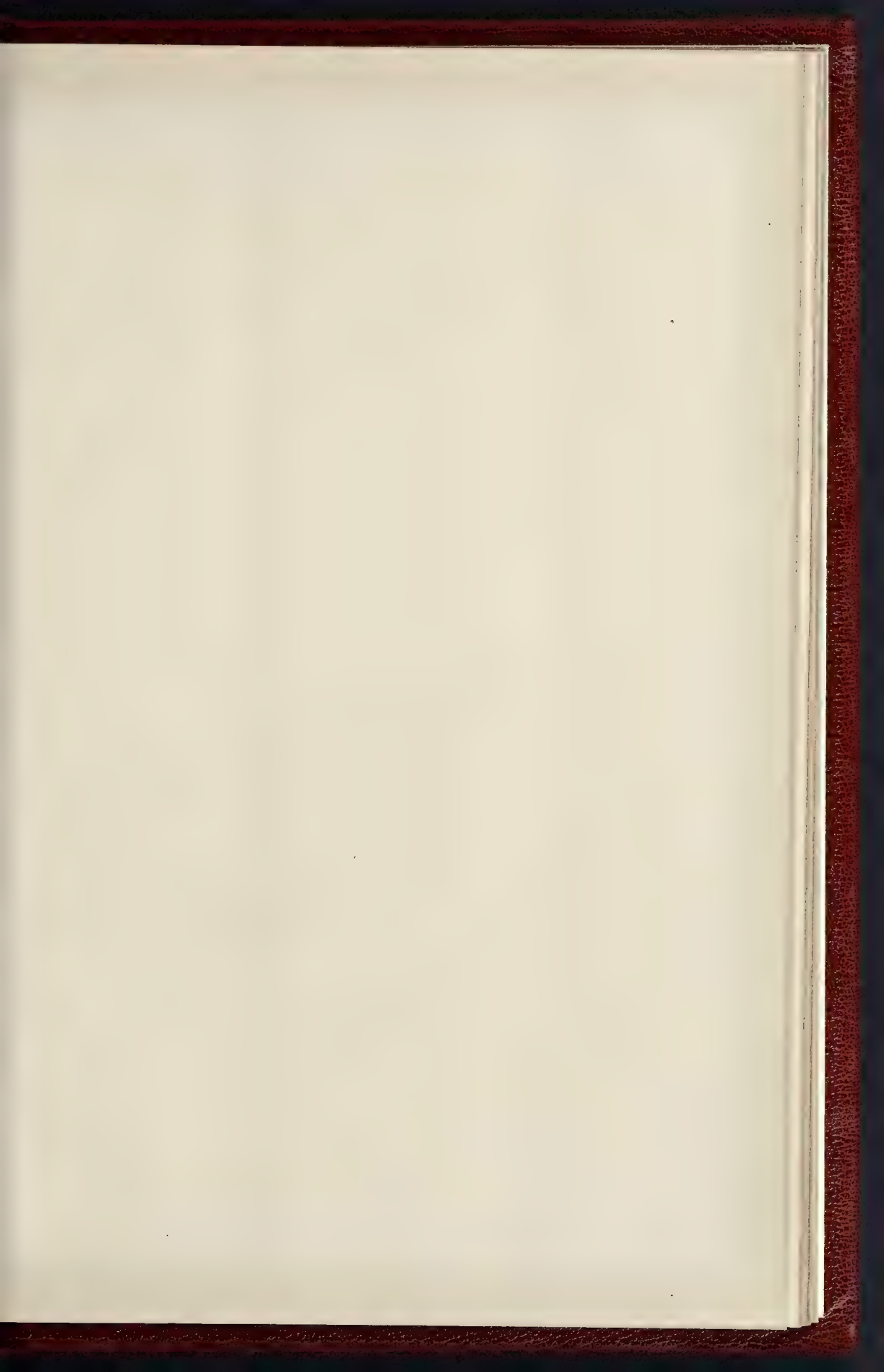




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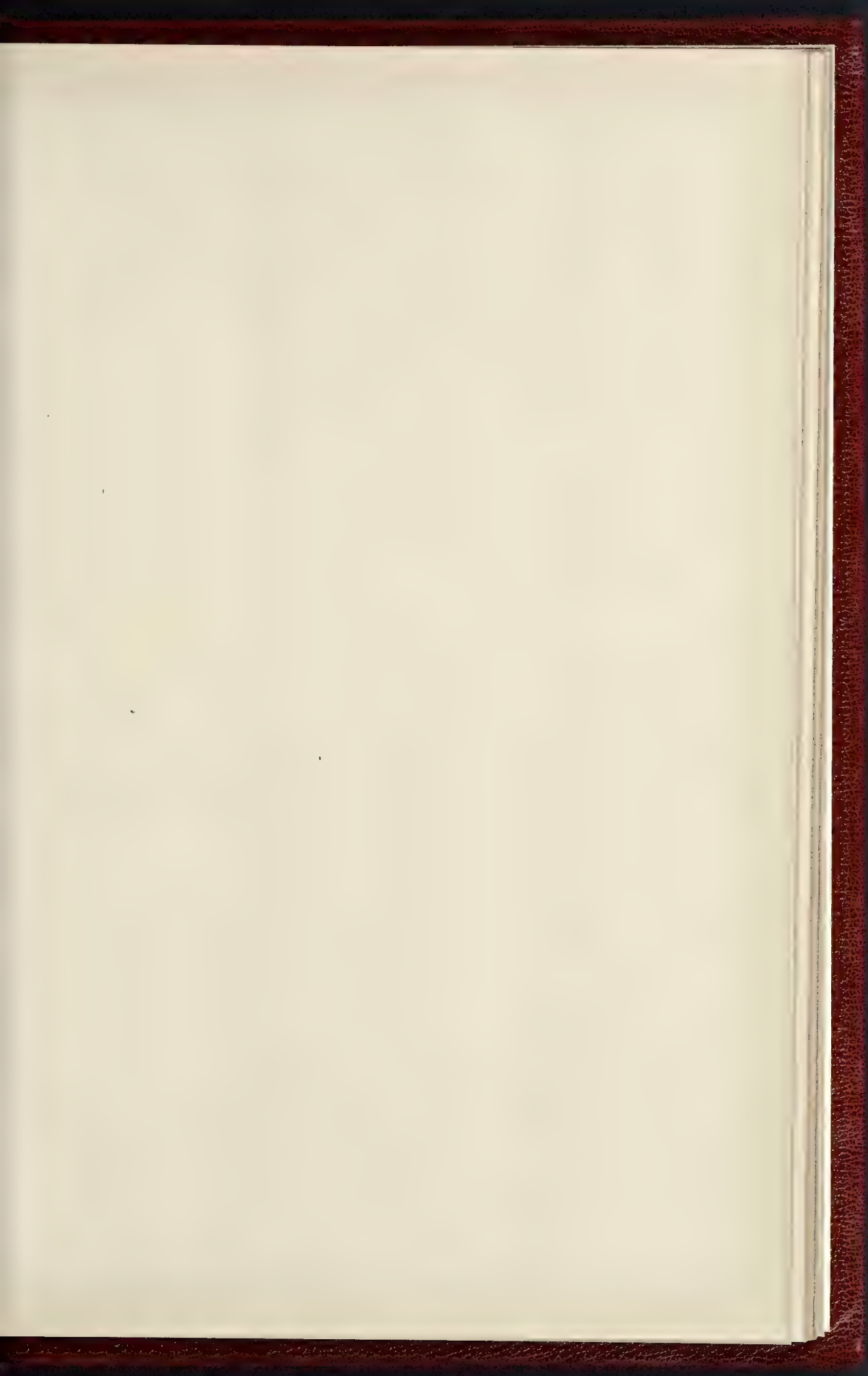
PEOPLE'S THEATRE WO

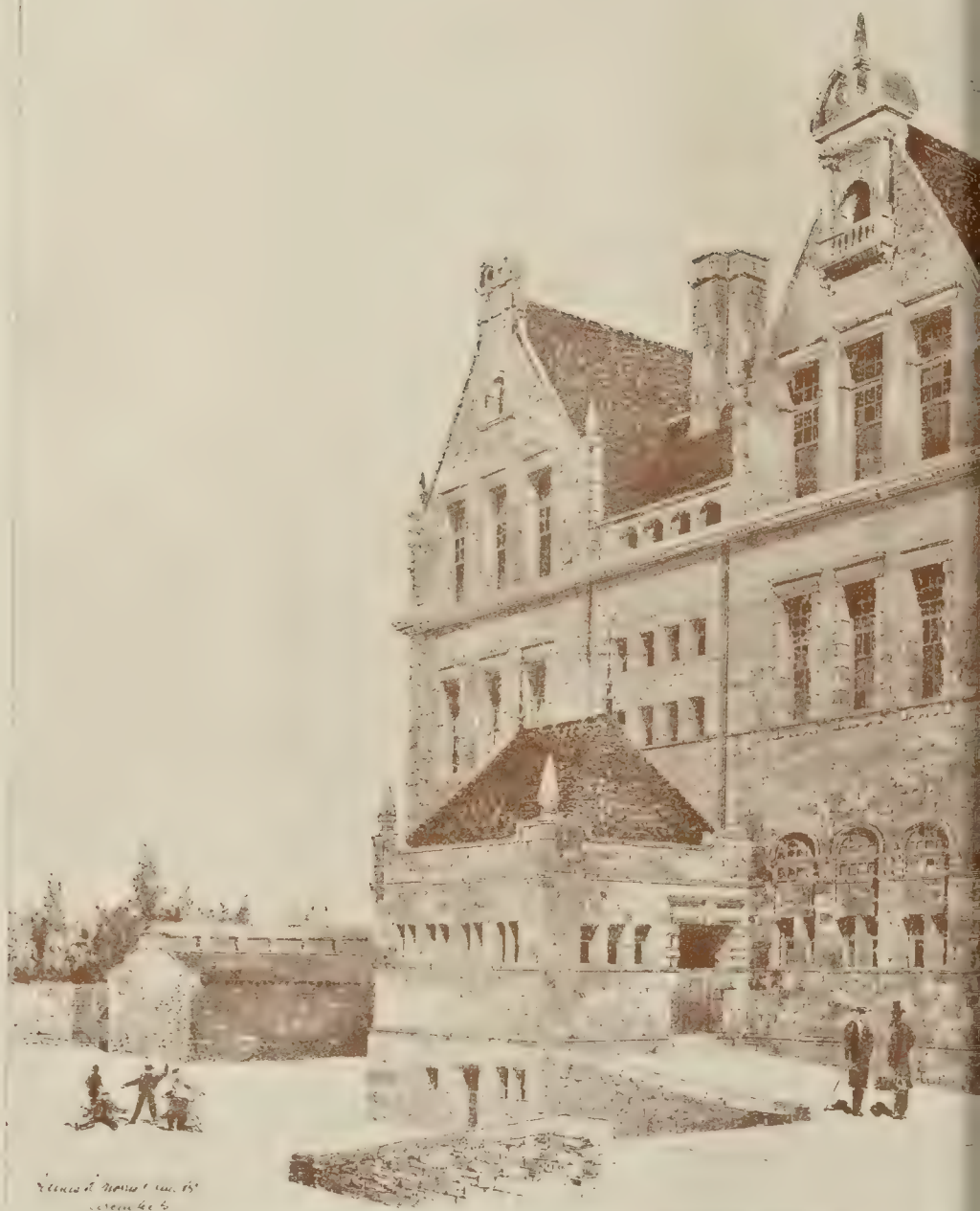












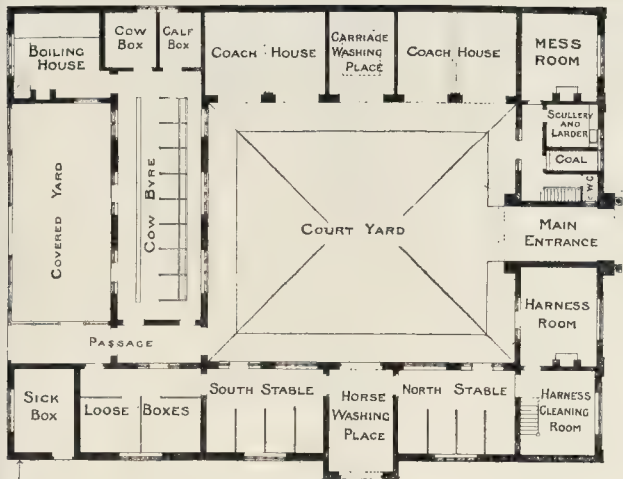




LEITH BY MESSRS. MORRIS & HONTER



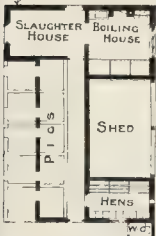




BICKLEY HALL STABLES

60'-0" SCALE OF FEET

Ernest Newton, Architect  
& Raymond Buildings  
Grays Inn W.C.



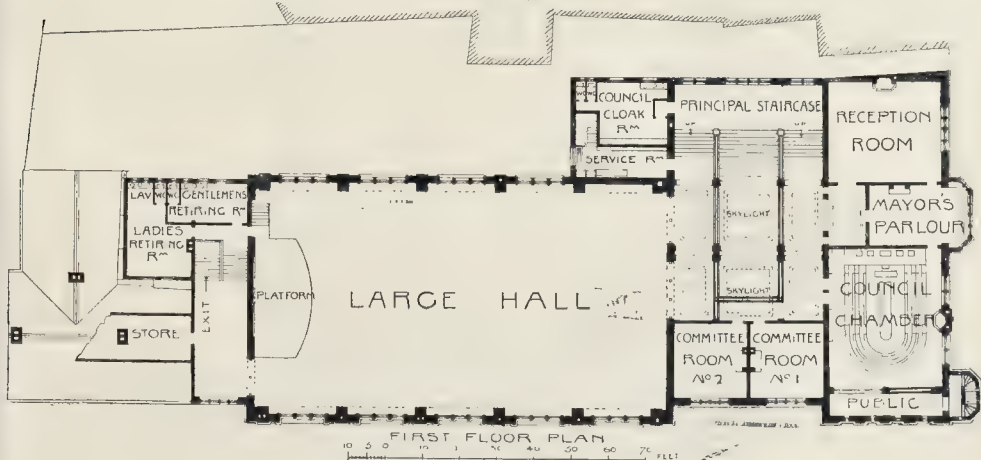
# THE SANITARY ASPECTS OF THE LONDON BUILDING ACT.

A SESSIONAL meeting of the Sanitary Institute was held at the Parkes Museum on Wednesday evening, when a discussion took place on "The Sanitary Aspects of the London Building Act, 1894." Mr. Ernest Turner, Chairman of the Council, presided.

Dr. G. Blundell Longstaff, M.A., Chairman of the Building Act Committee of the London County Council, opened the discussion. He said the London Building Act, 1894, was a very extraordinary measure in many ways. In the first place it passed Parliament as a private Bill, repealing, in whole, seven public Acts of Parliament, and partially repealing seven others. In the next place it was a private Bill, consisting of 218 clauses, in four schedules. It was such a large work that prominent and experienced Government officials, up till the last moment, did not think that the County Council was

serious in its attempts to pass the measure. That the Act would be free from difficulty in administration he did not for a moment wish to contend, nor that it was free from ambiguity; in fact, the London County Council had already instructed eminent counsel to give them an opinion in one case as to what the Act meant. They were not, however, asking for an interpretation of the Bill as they introduced it, but of the Act as it emerged after going through two Select Committees. He wished to say, in justice to the opposition of the measure, that he was free to admit that the Bill as originally introduced was an impracticable Bill. It was not, if he might say so, intended to be practical in its then form, but he was perfectly convinced that they adopted the right plan in introducing it as they did. Had they attempted to meet the opposition, and to foresee the difficulties, they would not have had a good measure now, because it was not until they were brought into direct contact with those difficulties that they saw where the shoe pinched. He was prepared to go further and say that although the symmetry of some portions of the Bill was necessarily marred by having a number of people going at it in different directions without one consistent idea, the measure in its present form was altogether a better measure than that which was introduced by the County Council this time last year. Dealing first with the definition clause, he remarked that whenever the height of a building was referred to in the Act, it meant the distance from the pavement up to the eaves, or the parapet, or the base of the gable. Section 13 of the Act passed with comparatively little trouble through Parliament, and to his mind it was worth the whole cost of the Bill, which might be approximately represented as 10,000*l*. This was the clause which stated that no person should erect a building nearer than 20 ft. from the centre of the street, unless it be upon the site of an old building. There was very little difference, except in words, between this and the present law. But near the end of the clause there were these important words:—"Provided always that no dwelling-house to be inhabited or adapted to be inhabited by persons of the working class, shall, without the consent of the Council, be erected or re-erected within the prescribed distance to a height exceeding the distance of the front or nearest external wall of such building from the opposite side of such street." There were many areas in London like the Bethnal Green area, where the streets ran from a width of a little less to a little more than 20 ft., and from two to three stories in height. Under Cross' Acts all that could be done was to buy the whole area out and reconstruct it; for this reason, that if they proceeded to condemn those houses and closed them the landlord always had it in his power to re-erect them at a greater height than they were before. The consequence was that the only plan they could adopt in order to prevent people from crowding on the ground was to buy the landlords

## DESIGN FOR MUNICIPAL BUILDINGS DARLINGTON



out entirely and have the building reconstructed, the cost of which was over 300,000. Now they would practically be able to force the owners of the land to let out their buildings, if they rebuilt in a reasonable and sensible manner. Referring to the angle clause, he said he had heard it spoken of by some blaspheming adversary as "the Longstaff clause," but he repudiated the charge. The gentleman who had the honour of having originated the principle upon which that clause was based was Mr. W. Goldstraw, Building Surveyor, of Liverpool. Since the Bill became law he (the speaker) had had the pleasure of going over the slums in Liverpool, and the reconstructed buildings under the angle rule of forty degrees, and he believed that if any architect were to go and see those buildings he would admit that they were as close together as they ought to be placed. As regarded buildings erected hereafter upon streets laid out hereafter, Parliament had granted a space of 10 ft. down to the level of the ground; then they had given an angle of about sixty-three and a half degrees, an angle which was such that the distance from the wall was equal to twice the height of the building. This had the same fundamental virtue of equity that applied to any angle, but it was not quite so much as he would like. He admitted that there were a number of streets which had been laid out so close together that it would be exceedingly hard on the landlord to enforce the first rule. It had been said that this was class legislation; so it was, but there were various things to be said in favour of it. If one was in the unhappy position of being the promoter of a Bill, the goal one aimed at was getting these mystic words "Royal Assent" printed on the first page, and one had to give up a good deal in order to achieve these words. From the point of view of the County Council, beyond that low motive of expediency there were motives which he thought were logically and legally correct, if they were not open perhaps to some economical objection. The offender in this question of class legislation was the Parliament which passed the Housing of the Working Classes Acts. These Acts placed the buildings of persons of the working-class in a different category from those of the people who were not members of the working-class, and Parliament made a difference between the houses of the working-class and those of other people by throwing upon the County Council the imperative duty, under certain circumstances, of (at practically whatever cost) buying out unhealthy buildings of persons of the working-class, and seeing that more suitable buildings were placed thereon. The County Council held that Parliament having insisted upon that, it was only fair that Parliament should give the same authority and the poor unfortunate ratepayers the power to say, "You shall not make any more of these unhealthy slums which we are to buy up and pull down." He held that this was an unanswerable argument to the objection of class legislation in this case. Referring to Clause 45, he said he had no reason up to this point to accuse any one of the eighteen or twenty learned counsel who were engaged cross-examining and bullying him for twenty-nine days of being anything like asleep, but at last they must have got tired and fallen asleep when this clause was passed, because it gave no discretion to the County Council, and there was no appeal against it. Next to the downright slums he considered that the model mansions were the worst in London, because they had so very little open space about them. They now insisted that there should be a certain proportion in the size of the courts. After dealing with various other sections of the Act, Doctor Longstaff said, in conclusion, that he thought those who were practically concerned with public health would say that the London Building Act of 1894 was a very important sanitary measure. He considered that it was a more important sanitary measure than any one which had been passed before for London. The Public Health Act and kindred documents as a rule dealt with things which were in their nature more or less temporary, or, at all events, with evils which were more or less remedied, but the bad laying out of a town, the construction of streets which were too narrow, the construction of buildings which were too lofty, and the construction of buildings too close together were evils which were practically, irremedial, and therefore a measure which was destined to prevent the recurrence in a city of such evils was a measure of the very first class importance. Any one who had had the pleasure of seeing the slums of Liverpool would know

what a gigantic evil resulted there through that city extending at probably an unparalleled rate at a time when practically there was no supervision over the buildings. They would also see on every side the evidence of great activity on the part of the Corporation in trying to remedy that state of affairs, and the evidence of the enormous cost to which the ratepayers of Liverpool had been placed through not having had building legislation at an earlier date. But once bitten twice shy; Liverpool now had a better building code even than London would have in 1895.

Mr. W. Goldstraw (Liverpool) said that London was to be very warmly congratulated upon having obtained such a beneficial Act as the one in question. In his opinion, however, the Bill as originally introduced was better than the Act as finally passed. He did not mean better in point of form, because he was sorry to say it was never very good in that respect, but with regard to the matter. He could not help thinking that if the angle of 45 deg. had been retained as applicable to dwelling-houses, and that the angle of 63½ deg. had been applied to domestic buildings, or some of them, the regulation would have been better than it was.

Mr. H. Percy Boulnois (Liverpool) said he thought it was a pity that the Act had not been more of a consolidation Act, consolidating the whole of the London Acts into one large Bill. The provinces had been undoubtedly ahead of the Metropolis in all sanitary matters, and he thought that fact might be attributed to this, that nearly all the Metropolitan Building Acts were framed under the panic that ensued after a great fire. With regard to the question of carrying the party-wall through the roof, he looked upon that as a harassing and unnecessary measure, and he thought if this were taken out of these Bills and more sanitary provisions were put into them it would be better. The Bill did not receive the support that he ventured to think it might have received from the members of the profession in the Metropolis, and he assumed that the reason was that they felt that the interests of their clients should be protected. With regard to the area at the back of buildings, it was a pity the County Council did not accede to the angle of 45 degs. as a whole.

Dr. Louis Parkes said the County Council had done a very great work in carrying through a large Bill of this sort.

Mr. E. T. Hall said the Institute of Architects did their very best to assist the County Council to make the Act a thoroughly good one, and they were the original cause of the Bill being brought forward at all, although they were at last obliged to oppose the Bill with a view of making it more perfect. It was to be regretted that the Bill did not contain provision for the drainage within buildings. The interpretation of an inhabited room in the Act differed from that of the Public Health Act passed only two years ago. He thought it would have been conducive to the working of both Acts if they had had one interpretation. The great feature of the Act was the angle, and he thought the angle of 63½ deg. was a fair and reasonable compromise, having regard to the immense value of land, and of the business which was carried on in London.

Professor Banister Fletcher asked what was considered an adequate provision for the ventilation of courts. With regard to the diagonal line, he thought it would lead to a large amount of bad building, and if something could even now be done by which that angle should stop when it touched the back wall, it would be most advisable in the interests of sanitation that it should be done.

Mr. Wallace Bruce, L.C.C., made a few remarks, and pointed out many of the advantages to be derived from the measure.

Mr. T. W. Blashill said he was not so satisfied with the Act as some people thought he ought to be. Anyone who had any familiarity with Continental cities, whether of the older type, which were increasing, or whether of the newer type, would be much dissatisfied with it. It was like being in another world to get to such cities as Berlin, where, instead of seeing streets of the beggarly width of 40 ft., they saw them 150 ft.

Dr. Longstaff, in the course of his reply, said the County Council were very much indebted to the Institute of Architects for what they had done in connection with the Bill, but when Mr. Hall tried to claim that the Institute initiated the New Building Act, he begged to differ from him. He (the speaker) was appointed in the spring of 1889 a member of the Building Act Committee, and within a few weeks he was also appointed a member of the Sub-committee of the London

Building Acts. That Committee began its work six years ago, and for six years he had laboured upon the Bill. As regarded the question of adequate ventilation, he must refer Professor Banister Fletcher to the Chairman of the Committee who put in these words.

The proceedings terminated with a vote of thanks to Dr. Longstaff.

## THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

*Salisbury Estate, Strand.* The Establishment Committee brought up an adjourned report in reference to the suitability of the Liberator buildings on the Salisbury Estate, Strand, for the purpose of the Council, an abstract of which appeared in our issue of the 17th ult.

Mr. Fardell moved, "That the matter be referred to the Committee, with an instruction that the officers of the Council shall confer with the Official Receiver in companies' liquidation, in order that a fuller report in regard to the possibility of adapting the buildings to the requirements of the Council may be supplied." He said that the Council had increased the staff of clerks by 280 in six years, and if the Liberator property was bought it would accommodate 253 more persons than was represented. It could accommodate 771 persons against 482, and including the eastern block it could accommodate 1,395.

Lord Monkswell seconded the amendment. Mr. Dickinson, Deputy Chairman, said the lighting arrangements was one of the great faults of the building. Many of the rooms were so dark that they would be useless for anything except storage.

The amendment was lost and the report agreed to.

*The Purchase of the Water Companies.*—The Parliamentary Committee reported that they had prepared eight separate Bills for the acquisition by the Council of the undertakings of the eight Metropolitan Water Companies. The matter being one that required special and undivided attention, they referred it to a Sub-Committee on which members of the Water Committee and two members of the Finance Committee served, and for some months past the Sub-Committee had been engaged in the preparation of the Bills. These they had now submitted, and their general principles were such as they could advise the Council to approve. They recommended: "That the eight Bills, entitled Lambeth Waterworks (Transfer) Bill, Southwark and Vauxhall Waterworks (Transfer) Bill, Kent Waterworks (Transfer) Bill, East London Waterworks (Transfer) Bill, New River Waterworks (Transfer) Bill, Grand Junction Waterworks (Transfer) Bill, West Middlesex Waterworks (Transfer) Bill, and Chelsea Waterworks (Transfer) Bill, for the transfer to the Council of the respective undertakings of the eight Metropolitan water companies, be approved; that the seal of the Council be affixed to petitions for leave to bring in the Bills; and that the Bills and petitions be deposited, pursuant to the Standing Orders of Parliament, with such necessary alterations (if any) in the Bills as the Parliamentary Committee may consider desirable."

Mr. Campbell, who opposed the recommendation, moved as an amendment that it was expedient that only one Bill be proceeded with now; and he suggested that when the Council had experience of one, they might then go on.

Mr. Beachcroft seconded the amendment. He asked what information the Council had as to the operation of the sinking fund that must be established. If the Council got the waterworks, then, assuming the period of repayment extended over ninety years, the loss would be 120,000, a year, or nearly 14d. in the pound on the rates; if the period of repayment was six years, then the loss would be 289,000, or a rate of 2d.; if forty years, the loss would be 539,000, or an increase of nearly 4d. in the pound. In the present state of the Council's finances this was running a great risk.

Colonel Ford suggested that sea-water could be used for sanitary purposes, as nine-tenths of the present supply of fresh-water was used for such purposes.

Mr. Westacott opposed the amendment on the ground that there would be practically one fight before the Parliamentary Committee on the whole of the Bills.

The amendment was rejected. Mr. Bassett Hopkins then explained that the



Bills provided that the Council on the one side and the water companies on the other should enter into a voluntary arrangement for a transfer of the companies' undertakings. Failing any such agreement, another clause gave Parliament the power to say that the undertakings should be transferred after a certain date named in the Bills, and that all the rights and liabilities of the companies should pass over to the Council upon terms which took the form of arbitration. It was further provided that there should be three arbitrators, one appointed by the Council, one by the companies, and the third by the Board of Trade. He detailed the powers of the arbitrators, and went on to contend that the Bills were financially sound.

Mr. Westcott, while believing that it was the duty of the Council to take over the undertakings of the water companies, did not think Parliament would give them the power unless they paid a fair and reasonable market price for them.

The recommendation, after some further discussion, was agreed to.

**Jobbing Work and the Works Committee.**—Paragraphs I. and II. of the Fire Brigade Committee, which we printed last week, page 413, gave rise to some discussion. The Committee recommended that the additional expenditure be sanctioned.

Mr. Ward moved an amendment that the following words be added:—"And that as the Works Committee has had no opportunity of estimating for the above works, the architect's original detailed estimate, together with any subsequent additions, be sent to the Committee for report to the Council as to where, in the opinion of the Works Committee, the work as carried out differs from that estimated for either in quantity or price."

Lieut.-Colonel Ford seconded the amendment. Mr. Weir, M.P., said he understood the Works Committee did have information, and he could not understand the excess on the works. Either their architect was incompetent or the Works Committee was incompetent.

Mr. Westcott asked if those were the only cases where there was an excess of charge, as he understood that there were no fewer than 600 cases where the cost had exceeded the estimate.

Mr. Taylor said the work as carried out was really in accordance with the specifications. He considered it unfair to make these charges against the Works Committee.

Mr. Urquhart, on behalf of the Committee, agreed to accept the amendment, and, replying to Mr. Westcott, said it was a fact that in 600 cases there were discrepancies.

After further discussion the amendment was further amended, so as to include all jobbing works, and this was agreed to.

After transacting other business, the Council adjourned soon after eight o'clock.

#### ARCHITECTURAL SOCIETIES.

**BIRMINGHAM ARCHITECTURAL ASSOCIATION.**—The third ordinary meeting of this Association was held on the 30th ult. in the Exchange Building, Birmingham. The President (Mr. William Henman) occupied the chair. After the election of new members, Mr. F. R. Farrow, F.R.I.B.A., of London, read a paper on "Preparation for the Examinations held by the Royal Institute of British Architects." He said that for the future all desirous of attaining the distinction of an Associate of the Institute would have to pass through three progressive stages of examination, of which he gave details, together with hints as to the best books to study. The Final Examination of the new course had not yet been held, so that they were rather in the dark as to what form it would take; but one thing was certain, that it would be much more difficult than the Qualifying Examination in the past, as the Intermediate Examination must be considered about equivalent to that; and he advised students to make the most of what Mr. Bidlake and the Birmingham Association had to teach them, and said he did not doubt that if candidates would take advantage of these and other facilities provided for the education of architects in Birmingham, they would have no difficulty in getting through.—Thanks were voted to Mr. Farrow for his paper.

**SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.**—The monthly meeting of this Society was held on the 11th inst. at the School of Art. In the absence of the President at the commencement of the meeting the chair was occupied by Mr. F. Fowler, the Treasurer. The following new members were elected by ballot:—Mr. George Y. Gillham, Sheffield, as

Associate; and Mr. Thomas H. Robinson, Sheffield, as student. An interesting lecture on "Wentworth House; Historical, Descriptive, and Illustrative; with practical observations on some materials used in the building," was given by Mr. William Dickie. The lecturer referred to the early ancestry of the Fitzwilliam family, and carefully traced the history of Wentworth Woodhouse from the middle of the sixteenth century to the present time, giving descriptions of alterations and additions at various times, dwelling upon the great work of 1741-1743, with the names and interesting particulars of the various architects concerned. He then exhibited plans and elevations of the buildings, and explained in detail the dimensions, proportions, and decorations of the principal apartments, showing detail drawings of the work. The drainage of the mansion, the cellar and water arrangements, and the ventilation of the main sewer were fully described. An interesting account of the mode of casting the roof lead, gathered from implements in existence at Wentworth, was given, and specimens of lead from the roofs were exhibited. Samples of iron used in the work of Inigo Jones were produced, and slag concrete and other materials. Mr. E. M. Gibbs, President, who had arrived after the commencement of the meeting, proposed a vote of thanks to Mr. Dickie, and complimented him upon the excellent manner in which he had preserved the drawings in book folios, and thought in that respect architects generally might with advantage take a leaf out of Mr. Dickie's book.

**LIVERPOOL ARCHITECTURAL SOCIETY.**—On the 3rd inst., Alderman P. H. Rathbone read before a meeting of the Liverpool Architectural Society, held in the Law Library, Union-court, a paper on "The Economical Value of Fine Architecture." Permanence of prosperity for any city depended, said the lecturer, upon the use it made of its accumulated wealth. The building of handsome buildings was one of the best of those uses. History proved it. They could not get a sense of citizenship out of an accumulation of meanly-built and ugly streets. Public buildings, especially, formulated the nobler and purer ideas of citizenship. They were enduring witnesses to the intellectual life of the city. Liverpool was filled with intelligent men, fitted to become the leaders of civilisation, and the question before them was whether it should sink into a mere port, in which no one would live except from necessity, or take its place among the memorable cities of the world. Small as its beginnings were, he indulged the hope that the School of Architecture would save Liverpool from becoming the mere poverty-stricken asylum of labourers and artisans, for in these days of telephone and telegraph the ablest minds would settle where there was most intellectual life, leaving the hewers of wood and drawers of water to inhabit the backyards and outbuildings of civilisation. The buildings of the city would have much influence in helping Liverpool to become and to continue a great intellectual centre. Our great steamers cost half-a-million each and would not last fifty years. A building costing that sum would last for centuries. For us to proceed in this direction needed nothing but the will; we had the wealth in abundance, but at present preferred to spend it in building docks for Buenos Ayres. We had a population which, with instruction, was capable of making the best artisans in the world, and the sure means of saving ourselves from the disastrous vicissitudes of trade was to strive to become a centre of skilled crafts. Mr. J. M. Hay, in proposing a vote of thanks to Alderman Rathbone, pointed out that the difference in total cost between making a building an abortion and a work of art was small, and compared with the actual value added to property by good architecture, was a mere nothing. Good architecture was, therefore, one of the wisest of investments. Alderman Rathbone, in replying, said the point referred to by Mr. Hay was illustrated by St. George's Hall. That building cost about 250,000*l.* Another 50,000*l.* spent in completing it would treble its value as a work of art.

**CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING ASSOCIATION.** A meeting of this Association was held in the Town Hall, Carlisle, on Monday, when a paper was read by Mr. Edwin B. Newton, City Surveyor's Office, Carlisle, on "Gauging the Flow of Water." The lecturer commenced by giving a brief summary of the history of the science of hydraulics, mentioning the earliest experimentalists and the results they arrived at. He then gave comparisons of the various formulae

in use at the present day, referring especially to those by Darcy and Rutter, pointing out the shortcomings of all, and expressing the view that to obtain a correct formula capable of universal application what was needed was accurate and careful observations of actual flow, and notes made of the various atmospheric and natural conditions prevailing at the time the experiments were made. He then described the various forms of current-meters, and detailed the operations necessary in gauging the flow of a river by means of floats, &c. The lecturer then explained the methods of gauging water by means of weirs of various shapes, and gave as his opinion that rectangular weirs were best for moderate flows. The several formulae for calculating the discharge over weirs were explained. The lecture was illustrated by diagrams and various instruments lent by the City Surveyor of Carlisle, Mr. W. Howard-Smith.

**THE GLASGOW SCHOOL OF ART.**—The opening lecture of a series on architectural study in the Glasgow School of Art was delivered on the 7th inst., in the Lecture Theatre, by Mr. Wm. J. Anderson, A.R.I.B.A. The lecture was a *résumé* of the evolution of architecture from the earliest times to the end of the Gothic period. It was pointed out that the history of architecture, like all other history, teaches that there is no such thing as continued and maintained progress and advancement. Thirty centuries before Christ some of the grandest architectural works in the world were erected—e.g., the temples of Karnac and Luxor, buildings which, at least in the qualities for which they are distinguished, have never been equalled. Besides that of Egypt, another important source of influence was the art of Assyria. Those met in Greek work, which, making use of the forms of both, combined also the majesty and dignity of Egyptian architecture with the freedom of picturesqueness of the Assyrian, and added great intellectual refinement and grace. The arch freely used by Egyptians, Etruscans, and Greeks in underground and engineering work was only raised by the Romans to the dignity of a constituent part of the architecture. The Roman also made a more extended use of the vault and dome. Byzantine architecture was described as being merely the later architecture of Imperial Rome transferred to Byzantium, and there coloured and influenced from the East. The Byzantine architects continued the development of the dome. After the break-up of the Roman Empire decline in every respect followed in the western part, and for centuries art was crushed out of existence till the rise of the Lombard Romanesque. The progress of this style in Italy and Germany was noticed, and the contemporary phases known in this country as Saxon and Norman. The lecture concluded with a short account of some of the English cathedrals, illustrating the history of the Gothic style at home.—*Glasgow Herald.*

#### ARCHÆOLOGICAL SOCIETIES.

**BRITISH ARCHÆOLOGICAL ASSOCIATION.**—On the 5th inst. a meeting of this Association was held, Mr. C. H. Compton in the chair. It was announced that, upon the retirement of Mr. Allan Wyon, F.S.A., from the office of treasurer through illness, Mr. E. P. Loftus Brock, F.S.A., who had been one of the hon. secretaries for many years, had been elected to the vacant office. Various objects of antiquarian interest were exhibited, and Mr. J. T. Irvine called attention to some hitherto unnoticed carvings in Rothwell Church, near Leeds, where they have been built up into the internal walls. They consist of stone slabs, covered with interlaced work, probably of Saxon date. Mr. Park Harrison, M.A., showed some drawings of sculptured detail, of early date, in the triforium of Salisbury Cathedral, removed probably from Old Sarum when the cathedral there was demolished and reused as old material. The first paper was by Miss Russell, of Galashiels, on the use of branches in the construction of fortifications in ancient times. After referring to various classical authors, the statements of Polybius were dwelt upon in detail. These had reference to the superiority of the Romans over the Greek soldiers in the construction of fortified enclosures rapidly of boughs and branches. The ancient earthworks in England, and especially in Scotland, were noted. In these the feeble earthworks which at present exist would have been powerless without the security of palisade fences. In the Isle of Rothsay are many earthworks which indicate the former existence of such additions. In the discussion which followed, the Rev. J. Cave-Browne



described the defences raised by the Hill Tribes of India, and the native fortifications of Burmah, which are, alike, formed of earthworks and palisading. A paper on the Fleur-de-Lys of the ancient French Monarchy, by M. J. T. de Radda, was read, in the author's absence, by Mr. de Gray Birch, F.S.A.

#### ENGINEERING SOCIETIES.

**THE INSTITUTION OF CIVIL ENGINEERS.**—At the ordinary meeting of this Institution on the 11th inst., Sir Robert Rawlinson, K.C.B., President, in the chair, the paper read was on "Colliery Surface Works," by Mr. Edw. B. Wain, A.M.Inst.C.E.

**INSTITUTION OF JUNIOR ENGINEERS.**—At a meeting of this Institution, held on the 7th inst., at the Westminster Palace Hotel, Victoria-street, Mr. H. J. Young in the chair, a paper on "Waterworks and their Appliances" was read by Mr. William Mallock. Dealing first with source of supply, the author described generally the formation of the soil over or through which the rain passed on its way to the two classes of source, above-ground and under-ground, and reference was made to the systems adopted by the larger cities throughout the kingdom for obtaining their supplies. Diagrams were exhibited showing the arrangements and appliances in connexion with London water-works for well-sinking, boring, and driving headings into the chalk to the under-ground sources. The supply derived from London wells was gradually being exhausted, as was proved by their fall of water-level to the extent of 10 in. average per year; the above-ground source of supply would, however, be sufficient for many years to come. The geological formation of the Thames watershed, comprising an area of 3,500 square miles, was described, from which it was noticed how that on account of the extensive natural filtration it undergoes before passing to the river, the Thames water was so much purer than the river-waters of the north country, where the soil was generally impervious, and, therefore, unfit for filtering processes. In considering the question of storage, to which great importance was attached, various schemes were investigated applying to London, including Hunter & Fraser's, which had been accepted by the Royal Commission, and a proposal of the author's, whereby pumping expenses would be avoided, and other advantages obtained. A detailed account followed of the latest practice in regard to the different appliances in connexion with the processes through which the water passed from the intake, through screens, subsiding reservoirs, filters, pumps, service-reservoirs, valves, and mains to the consumers. The paper concluded with some remarks on waste prevention, which could best be secured by the adoption of Deacon's meters. They were being largely used by the more advanced water companies, and resulted in a great savings, in many cases of as much as over 50 per cent. In the discussion which followed, Messrs. R. N. Newman, Walter Hunter, F. L'Estrange, F. Fisher, B.Sc., W. Powrie, S. Boulding, and others took part.

**THE CIVIL AND MECHANICAL ENGINEERS' SOCIETY.**—On Wednesday last week the members of this society visited the works of the East London Water Company at Lea Bridge, and were shown over by the chief engineer, Mr. W. B. Bryan, the various engine-houses, turbine-houses, and other works of this ancient water company. The members inspected four Cornish pumping engines, three sets of triple expansion Corliss-gear engines, and a new set of triple expansion overhead marine-type pumping-engines, two compound horizontal pumping-engines, and four Hercules turbines used for pumping. The members were also shown a rotary pump made by the Drum Engineering Company, working under a head of 200 ft., which had been tested, and was stated to have yielded an efficiency of 80 per cent.; many and various apparatus for facilitating communication between districts; the working and governing of the engines and pumps; amongst these being notably that of the electrically worked stop-valve; and many ingenious contrivances designed by Mr. Bryan. The members were also shown over the new boiler-house; inspected the sluices, the tubular aqueduct over the canal, and had a very interesting description given to them by the engineer of the working arrangements of the company, the difficulties met with and overcome in obtaining water from their wells; and also were shown some of the original receipts of Messrs Bolton & Watt, for money paid to them at the end of last century for coal saved by those

pumping-engines that had been erected by them.

—The opening of the Session took place on Thursday. The President, Mr. C. T. Walrond, A.M.Inst.C.E., on taking the chair, read his address, and took for the subject of it "The Latest Development of Various Branches of Sanitation." Mr. Walrond began by drawing attention to the fact that the increased attention now being bestowed upon sanitation was largely due to the rapid growth of towns. He then referred to the improvements in the chemical treatment of sewage which are taking place. Next some recent forms of precipitation tanks were described, the "Candy" tank being specially alluded to, and its advantages for the ready removal of sludge without the necessity of drawing off the sewage or interrupting its flow were specially pointed out. The "Webster process" for the purification of sewage by direct electrolysis, the Hermite system of treating town sewage, not in bulk, but in detail, by a supply of electrolysed sea-water laid on to every house for disinfecting purposes, were described; to the latter system he saw serious objections. The Scott-Moncrieff system of bacteriological purification, which opens up prospects of a revolution in present methods of sewage disposal in the near future, was then considered. Mr. Walrond passed on to the subject of the use of "Distributors" in getting rid of town refuse; then to recent methods of preventing the filtration of water into or out of sewers; to the increased use of the transmission of power from central stations for automatically raising sewage; and to the problem of sewer ventilation, the key to which appeared to be, in his opinion, the diminishing of the number of ventilating openings, regulating their size, and using artificial means for extracting foul air from the sewers, for which latter purpose the exhaust air from "Shone Ejectors" could be usefully employed. Coming to the question of house drainage, the speaker recommended that soil-pipes as well as drains should be subjected to tests by the Surveyors to Local Authorities, and urged the desirability of an authoritative set of standard tests and conditions, compliance with which would entitle a house to be registered according to its sanitary state, the register to be open to the public on payment of a small fee.

#### Correspondence.

To the Editor of THE BUILDER.

#### COMMERCIALISM IN ART.

SIR,—Having been much exercised in mind by Mr. Richmond's treatment of the commercial principle now prevalent in Art, at the Exeter Congress, I was much rejoiced to see it met so completely and reasonably in the current number of the *Builder*. There is yet a further consideration which may well be taken into account in dealing with the subject. High Art owes its rise to the principles of commercialism. In all countries the art of painting especially has been promoted and developed through the demand arising from the commercial prosperity of the people. Periods of war, depression, or poverty, are not such as to favour the production of works of art. Prosperity, on the other hand, creates a demand for them. Art of old was appreciated and valued at money's worth. Hence it became worth while for many of the better-educated class to devote themselves to painting, and to excel in it. None could really take it up in earnest without becoming deeply interested in it, and doing his best, apart from the payment. But the payment was a matter of course and of necessity. And "talk" upon the terrible inferiority of the art-element in the preponderating mass of what is produced as Art in window, reredos, or mural decoration at the present day, will go for very little. Although it is the demand which has created it from slow beginnings, the inferior Art will still command only the comparative price of inferior Art, which alone is within the reach of the many. And this, again, is but the exact parallel of what has gone before.

The painter's "best" in the Middle Ages, under ordinary conditions and circumstances, was but little, if any, better, either in effect or in pay, than the "best" which is produced by inferior painters now. There were then (as now, we may hope) true artists who produced work that should stand the test of ages, and should serve as models for distant, if servile, approach to imitation. But it must be simply and supremely Quixotic to contend for the supremacy of high Art to the exclusion of all attempts to supply the demand,

and to fill the void, occasioned by a long period of depression and lack of appreciation. In order to rise to the highest condition of cultivation men should be associated with none but the most perfect and most beautiful of objects. This is universally admitted. But this highest cultivation is not within the reach of all, not even of the majority. And it certainly is not taking the highest ground to deny to all the less cultivated in the land the enjoyment and the benefit to be derived from the civilising influence even of the lower forms of Art, so far as they may become available for the purpose. This would not tend either to the welfare of Art, or to the happiness and edification of the people. Mr. William Morris claims to be a Radical in his art-teachings. With all my Conservative proclivities, I suppose I may be set down as something worse.

WILLIAM WHITE, F.S.A.

#### TEWKESBURY ABBEY.

SIR,—There are two points in the architectural history of this building which you may think proper to notice more fully in your republication of the interesting series of abbey now in hand.

The fourteenth-century ambulatory and chapels round the apse, which when complete no doubt included a Lady Chapel, were not thrown out from the fourteenth-century presbytery and apse, but from the Norman building, which at the time must have been intended to remain. As regards the ambulatory this is very clear. Its vaulting ribs spring from the old capitals of the Norman columns, and the masonry of its vaults is lower than the fourteenth-century arches of the apse. When the Norman arches were taken down, and more lofty openings made, this masonry was exposed, and it was imperfectly faced with a diaper pattern. I pointed this out in a letter to the *Builder* several years ago, and now enclose a copy of a paper which I read before the Worcester Diocesan Architectural Society in 1877, which deals with this and other important points. At that time excavations were made, and I found the foundations of the third of the successive eastern Lady Chapels, which was built in the thirteenth century. The tradition that it had been 100 ft. long was found to be correct.

As to the thirteenth-century chapel built against the end of the north transept, the use of which has not, you consider, been satisfactorily explained, I will venture to say that there can hardly be any room for doubt in the matter. The original Norman eastern Lady Chapel would be for the use of the monks, and would be quite inadequate for the numbers of the laity who desired to participate in the services in honour of the Blessed Virgin. It was for these that the great Lady Chapels were built in so many English and Continental churches. Besides the Elder Lady Chapel at Bristol, which you notice, there are very many examples of chapels placed on the side of the transept or choir, opposite to the monastic buildings, so that the laity could have free access to them. There is a Norman or Transitional example at Workson, and a fourteenth-century example at Ely. In French churches, such chapels were sometimes detached. At Durham, the Lady Chapel was built at the west end after an attempt to put it at the east end had been miraculously prevented. At Glastonbury, the west end seems to have been chosen from a sense of its greater suitability.

But when the thirteenth-century Lady Chapel at Tewkesbury was partially destroyed, it had become the practice to place such buildings at the east end of a church.\* The fifteenth-century Lady Chapel was accordingly built here. Suitable arrangements could easily be made for its use at different hours by the monks and by the laity. From an architectural point of view this position is clearly the best.

THOS. BLASHILL.

P.S.—I cannot now refer to my notes, but I think the thirteenth-century chapel attached to the north transept must have fallen before the fourteenth-century apsidal Lady Chapel was built.

#### BALL-ROOM FLOORS.

SIR,—Your correspondent may be interested to know that ball-room floors are sometimes mounted on springs. There is a floor of this nature in Cork, and the experience of all who have danced on it is that the rhythmical motion of the floor renders dancing much less fatiguing than on a rigid one.

Cork.

ARTHUR HILL, F.R.I.B.A.

\* The Secular Canons of Hereford had adopted this position as early as the thirteenth century.



# "BALL-ROOM FLOOR" AND "CAST-IRON TANK."

SIR,—A long way back amongst the volumes of the *Builder* (I regret I have lost my reference note as to have to trust to memory), your correspondent, whose letter, page 418, contains an inquiry about ball-room floors, will find a minute description of the floor of a hall built in the country by an enthusiastic military officer for the use and benefit of his neighbours, the villagers, whose houses were near his residence. The principal special points of construction were that the whole floor was supported on lump rubber springs, such as are (or were) used for tramway cars, and that the flooring surface did not quite extend to the walls, but was allowed a small space around the edges, so that not only was elastic motion in a vertical direction provided for, but a slight horizontal motion, or swing, was permitted. The result was, according to the report of the major, quite satisfactory.

I do not know what reputation Willis's Rooms had for the construction of its floors for dancing, but when the building was pulled down it was found that the construction of the floors was somewhat elaborate and unusual, and it was surmised that much trouble had been taken to render them acceptable to the voters of Tisbury. Mr. W. Johnson, builder, of Wandsworth Common, who had some hand in the demolition, reported this to me, and would no doubt be able to give your correspondent further particulars.

Another floor which is much appreciated by dancers is that of the Bromley Vestry Hall, E. There is nothing peculiar in its construction, except that the surface is of teak. The bearings are divided into lengths of about 10 ft. by walls and rolled iron joists, the floor is then wood-jointed with 8 in. by 2½ in. cut out of balk Dantzig, covered with inch deal laid diagonally, traversed, and finally laid with ½ in. teak in narrow widths, waxed. Dancers come long distances to exercise upon it. The teak was not laid with any view to dancing, but to comply with the wishes of those connected with a Vestry in a neighbourhood connected with shipping interests; and all ship-men swear by teak for all purposes. It is indeed a fine wood for a floor, as well for use and wear as for ease of colour and tone. Good selected Honduras mahogany, without wax or polish, would, I think, make a very useful and effective floor surface.

Re "Iron Tank" letter (same page), "Clerk of Works" probably does mean what he says, viz., a "large cast-iron tank," notwithstanding the editorial note at foot of his letter suggesting galvanised wrought-iron tank. Large tanks are usually of cast-iron flanged plates, bolted and tied. The best method is to imbed the projecting flanges of bottom either with tiles in Portland cement, or with Portland cement concrete, and to finish the floor smooth with trowelled cement, with slight fall to wash-out outlet. As to the vertical sides, it is better to clean them of all detachable scale and rust, and cover them either with Portland cement-wash or lime-wash, which should be occasionally renewed when the tanks undergo periodical cleansing.

ARTHUR HARTSON.

## IRON WATER-TANKS.

SIR,—If "Clerk of Works" will give his tank while wet a good coating of cement wash I think he will be satisfied.

I presume the water is for domestic use.

J. B. WILSON, C.E.

## LARDERS.

SIR,—I frequently notice in plans, illustrated in your paper, that are admirable in every other respect, the larders having their approach direct from the sculleries. Surely this is very objectionable for obvious reasons. It is always better to have the larder opening either directly from the cool side of the kitchen, or (still better), from a passage or lobby outside it. I think your own expression of opinion on this point might be of value to your numerous readers.

E. SWINEN HARRIS.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XXIV.

#### WELLS.

WELL-SINKING on a large scale for rural water-supply is of rare occurrence, and the details, which necessitate an extensive knowledge of practical geology, are so numerous and complicated that the subject cannot be dealt with satisfactorily within the limits of these papers. The principles and methods have been comprehensively dealt with in several standard treatises upon the subject, and to these the student must be referred. As, however, wells may be said (and often unfortunately so) to form the most frequent source of supply for villages, groups of houses, and isolated

dwellings in country districts, some details upon this branch of the subject will be given here.

Wells may be classed under three heads:—

1. Shallow or Surface Wells, fig. 56.
2. Deep Wells, fig. 57.
3. Artesian Wells, fig. 58.



Fig. 56.



Fig. 57.

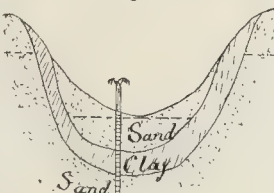


Fig. 58.

In Chapter 2 whilst referring to the disposal of the rainfall, it was stated that "a portion of the rain sinks into the ground and forms underground reservoirs in which wells are sunk, issuing again at the lowest lip as springs." When a porous stratum such as sandstone or chalk, which has the power of retaining water in its pores or fissures, is superposed upon an impervious stratum, such as clay, the porous stratum will be saturated and the water held up as in a basin, to a plane inclining towards the lowest lip which is generally the outcrop of the impervious stratum. If the porous stratum is adjacent to the surface of the ground, the plane of saturation is generally at no great depth; and if a well is sunk to a point below this plane, water will collect in it and stand at the level of the plane. This constitutes a shallow well. Under these circumstances the level of the plane of saturation is very variable, being rapidly affected by the rainfall. As the rainfall in its passage into and through the ground on account of its highly solvent nature, takes up and carries with it any impurities, more particularly of an organic nature, which it meets with on its way, and as the distance through which it has to pass before flowing into the well is usually very short, shallow wells are dangerous sources of water supply for domestic purposes. It is only in such cases as where the well is in an isolated position, in a rural district, and sufficiently removed from any possible source of pollution, that its use in this connexion should be permitted. Wells of this description must be properly walled in or stoned with stone, brick-work, or concrete, and in the two first cases the joints should be made thoroughly watertight with hydraulic lime-mortar or cement. The top of the wall should be protected by a raised curb where a bucket is used for drawing the water, and fitted with a proper cover, or where the water is drawn by means of a pump, the top of the well should be domed or flagged over. The bucket system has an advantage over the pump in affording greater facilities for cleaning out the well, which should be done once a year. On the other hand, the pump-well through being permanently covered over is less liable to pollution from the surface. As the water in shallow wells is usually of a soft nature, the suction-pipe of the pump should not be composed of lead.

Deep wells are those which are sunk through an impervious stratum to a porous or water-bearing stratum beneath it; the water being held up in the latter by an impervious stratum underneath it again. The terms deep and shallow in connexion with wells do not therefore refer to

the actual depth of the well, and a shallow well may, in fact, be deeper than a deep well. Deep wells, if properly constructed, constitute excellent sources for domestic supply. The rainfall which feeds them is collected upon the exposed surfaces of the water-bearing stratum, which are usually situated at a distance from the site of the well, and becomes purified in its passage through the ground. On account of its prolonged contact with strata at some depth below the surface, deep well water usually contains a considerable amount of mineral matter in solution which it has taken up during its passage; this gives it a hard character. Deep wells have also the advantage of being slowly affected by the rainfall, and the level of the water in them is fairly constant. It is of paramount importance that any percolation from the beds above the impervious bed through which the well is sunk should be effectually prevented. This is done in a manner similar to that described for shallow wells. The precautions at the surface are the same in both cases. The level at which the water will stand in a "deep well" depends upon the elevations of the collecting ground and the line of overflow, the principles upon which it depends being the same as already described in reference to the virtual slope or hydraulic mean gradient of water flowing in pipes.

There is a continuous flow of water in saturated strata from the collecting area towards the outlet which is usually the bed of a river, or the shore of a lake, or the sea. The surface-level of this moving body of water, which may be called its virtual slope, depends upon the resistance of the materials which compose the strata through which it flows, the presence of faults or dislocations, and the physical features of the land; technically, the first of these includes the other two.

Should the point selected for sinking a deep well be situated beneath the virtual slope of the water in the saturated beds, then, when these beds are reached, the water will rise to the top of the well and (were it not for the resistance of the air) above it to the virtual slope at that point. This would constitute an artesian well. The name is derived from Artois, a province of France, where this form of well was first brought into general use. It will be evident to the student that the artesian well is only a special condition of the deep well. As in wells of this description the water rises of its own accord, either so as to overflow, or to within a certain distance from the surface, it is only necessary to dig the well to a sufficient depth to allow of the pump being fixed within 30 ft. of the lowest level to which the water rises, and to afford sufficient storage capacity. The remaining portion may consist of a small perforation bored down to the required depth which is lined with an iron tube, or occasionally left unlined when it passes entirely through rock.

The Abyssinian or tube well (fig. 60) is economical and satisfactory where the ground is suitable and where the water stands, or by deeper sinking may be made to rise within 30 ft. of the surface of the ground. This well consists of iron

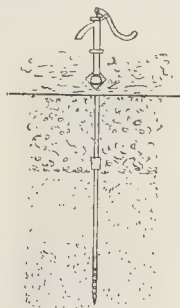


Fig. 60.

tubes from 1½ in. diameter, in sections, which are driven into the ground, the bottom section, which is perforated, having a steel point to enable it to penetrate. As the tube is forced down into the ground a fresh section is screwed on to the upper end of the last tube until the desired depth is reached. A pump is then fixed to the top of the composite tube, and the work is complete. An advantage possessed by this form of well is that it can usually be withdrawn and driven again in a new situation. Percolation of surface-water



between the lining of the well and the ground through which it is driven is also prevented.

The following is an estimate for an Abyssinian tube-well in gravelly ground, where driving-plant is provided and a well-driver, sent by the contractors to superintend fixing, labour being provided by the Authority:—

Estimate.		£ s. d.	
Depth, 30 ft.			
30 ft. 1½ in. Abyssinian Tube, hire of			
Plant and Well Driver	...	4	18 0
3-in. Abyssinian Column Pump, with			
Foundation	...	2	15 0
Well Driver's time travelling, say one			
day	...	10	0
Ditto Ditto Railway Fares	...	1	10 0
Carriage and Cartage of Plant and			
Materials	...	1	0 0
Labourer, 1 day	...	2	6
		£10 6 6	

For further information upon this subject, the student is referred to a pamphlet published by Messrs. Le Grand & Sutcliffe, Banhill-row, London, E.C.

The cost of digging wells depends upon the nature of the rock or soil through which the excavation has to be made, and upon the precautions which have to be taken to prevent the sides from falling in, and in dealing with the surface water.

There are two principal methods of constructing the steining of a well in treacherous ground. The first is to excavate to a certain depth, and then to build the lining of the well to the surface of the ground upon a wooden ring or kerb. The excavation is then continued for a further depth, and the kerb, with the cylinder of brickwork, or other material, allowed to sink. The walling is then continued again to the surface, the excavation and walling being carried on alternately until the required depth is reached. Iron cylinders in sections are also used, the principle being the same. The second method consists in underpinning and building beneath each section of the steining as constructed.

Half brick rings are usually sufficient, especially when laid in cement. The courses should break joints, and the bricks should be radiating.

It is always advisable to have a puddle or concrete backing to the lining of a well, especially near the surface.

#### OBITUARY.

MR. HERBERT A. GRIBBLE.—We have to record the death, on Saturday last, of Mr. Gribble, the designer (though not, we believe, the superintending architect throughout) of the Oratory Church at Brompton. Mr. Gribble was born at Plymouth in 1847. When quite a boy he showed very marked talent for art. He was early apprenticed to Mr. J. Norman, architect, of Plymouth, and at the age of twenty came to London to study at the National Art Training Schools, South Kensington, where he gained a National scholarship and many other awards, including gold and silver medals, for designs in architecture. About this time he became chief draughtsman in the office of the late Mr. Joseph Hansom, with whom he remained for upwards of ten years. It was soon after this that Mr. Gribble commenced business for himself, and showed his powers as an architect of great skill; and when the competition was opened for designs for a new church at Brompton, he amongst many others submitted designs. The committee gave their decision in his favour, and in 1880 the building was commenced from his designs.

#### GENERAL BUILDING NEWS.

UNDERGROUND CONVENIENCES IN PARKHURST-ROAD, NEAR HOLLOWAY-ROAD.—These conveniences, one of which is for men and the other for women, are, with the exception of portions of the attendants' rooms, constructed entirely under the carriageway of Parkhurst-road, and have been erected by the Vestry of St. Mary, Islington. The men's convenience comprises twelve urinals, five water-closets, and two lavatories; the other containing four water-closets, one of which will be free, and a lavatory with two basins. There is an attendant's room, and a store-room under the staircase, in each convenience. The brickwork has been built in Portland cement. The interior is faced with white-glazed bricks with a plinth and dado of blue-glazed bricks, the whole being laid with very fine joints. To prevent the soaking of water into the brickwork, a horizontal damp-course has been laid in all walls at the floor-level, and the back of the exterior walls has been twice coated with a boiling mixture of tar and pitch. The drains are formed of glazed stoneware socketed pipes, jointed with cement and made watertight. They are ventilated into chambers in the footway and up the lamp columns at each end of the refuge in the carriage-way. Jennings' "Midland" water-closets have been used, and they are flushed by

three-gallon cisterns. The basins are fixed by bolts embedded in concrete, so that a basin can be replaced without disturbing the tiling of the floor by simply taking off the nuts and placing another basin over the bolts, which remain fixed permanently in concrete, and replacing the nuts. Charles Smith & Sons' indicator looks have been fixed on the doors of the water-closets. The urinals are Jennings' Club pattern, of white glazed ware, with screens and backs of Rouge Royal marble. The lavatories are furnished with tip-up basins. All the frames of the doors and partitions have been set on chamfered bases of York stone 3 in. above the level of the floor in order to prevent their lower parts being injured by water splashed from the hose. The floors are laid with vitreous tiles. Cast-iron gratings have been fixed in the risers of the stairs and openings formed in the rear walls of the water-closets, so that a current of air may pass through the conveniences to the Blackman Exhaust Fans, which are worked by the pressure of water from the street main, the water being afterwards used for flushing the urinals and the drains. The roof of the conveniences is formed of steel troughing carried by built girders of wrought-iron. The troughing is covered with concrete, which forms the foundation of the paved carriageway above. The work throughout has been designed by Mr. J. Patten Barber, M.Inst.C.E., Chief Surveyor to the Vestry, and carried out by Mr. Geo. Jennings, sanitary engineer, London; the cost amounting to 2,460l.

Y.M.C.A. BUILDINGS, ST. AUUSTELL, CORNWALL.—The new buildings which have been erected at St. Austell by the local Young Men's Christian Association were opened on the 29th ult. The architect was Mr. H. Snell, of Plymouth. The ground-floor contains entrance-hall, cloak-room, and lobby, a large reading-room, secretaries' office, lavatory, and a gymnasium. On the first floor is the library and the lecture-room. The main staircase is of pitch-pine, with ornamental iron balustrades, and has a coloured-glass window by Fouracre & Son, of Plymouth. The entrance-lobby and lavatories are paved with encaustic tiles. The building is lighted throughout by electric-light, installed by Veale & Co., of St. Austell. The contracts were entrusted to Messrs. Hunkin & W. H. Smith.

HOTEL, WALLSEND.—A new hotel has just been built at Wallsend close to the north side of the Newcastle and Shields turnpike. The new structure has been constructed from plans designed by Mr. Hope, architect, Newcastle and Shields. The contract for executing the whole of the work was placed in the hands of Mr. Robert Bell, builder and contractor, and monumental sculptor, who executed the mason work himself, and sublet the plumbing to Mr. Hedderley, the plastering to Mr. J. Johnstone, the painting and decorating to Mr. S. Parr, all of Wallsend, and the slating to Mr. Edward Beck, of Newcastle.

BOARD SCHOOLS, ARDSLEY, NEAR SHEFFIELD.—A block of schools at Hunningley-lane, Stairfoot, built from designs of Messrs. Kaye & Twist, architects, for the Ardsley School Board, at a cost of 4,573l. 11s. 6d., exclusive of site, was opened on Monday. The school is built on the Central Hall system. Five class-rooms open off a central hall, and each of these gives accommodation for sixty children.

CHURCH, ALEXANDRIA, DUMBARTON.—St. Munro's Episcopal Church, at Alexandria, which has been in course of construction during the past twelve months, for the Vale of Leven Episcopal Mission, was opened on the 9th inst. The building has been constructed with the view to future extension, but meanwhile only the nave of the church has been built, the six arched bays on each side and the chancel at the west end being cemented over. The size of the church in its present form is 65 ft. by 30 ft. The roof is bound together by five arches resting on carved stone corbels. The wood is red pine stained and varnished. The church is seated for 250. The architect was Mr. J. M. Crawford, Dumbarton; the builder, Mr. James Barlas, Alexandria; and the joiner, Mr. James Shearer, Alexandria.

PEOPLE'S PALACE FOR GLASGOW.—On the 6th inst. the Glasgow Town Council considered and confirmed a project for the erection of a hall, art gallery, and recreation-rooms for the east end of the city. The plan which has been adopted shows the arrangements of a composite structure which in one part affords accommodation for a museum and gallery of art, the other provides an area which can be utilised alternatively for the display of flowers and sub-tropical plants, or for popular musical entertainments, or for other purposes of assemblage—the available floor space being sufficient to give standing room for over 3,000 persons. The art gallery is placed within a building three stories in height, designed in the style of Italian Renaissance. The frontage measures 120 ft., and the depth of the building is 43 ft. The entrance, through a triple archway, gives access to the staircase leading to the museum, on the first floor, and also to doorways which communicate with the winter garden. On either side of the staircase is a large room available for recreation, occasional exhibitions, or administrative use. The museum floorage extends over the whole length of the build-

ing, without sub-division, and is lighted from all sides as well as from the roof. The art gallery, on the upper floor, is reached by two stairways, one at either end of the building. The floorage is uninterrupted by partitions, and occupies the whole interior, with the exception of the light wells of the museum below. Provision is made for the display of pictures and other objects of art. The adjoining winter garden is a large structure of iron and glass, 180 ft. long and 120 ft. in width. The interior is laid out so as to be available as a promenade, as well as a place for the exhibition of floral and arboreal collections. There are three separate entrances to the winter garden, in addition to the two accesses communicating with the adjoining building. The committee's ideas have been interpreted by Mr. A. B. McDonald, M.Inst.C.E., who is responsible for the plans of the building.

#### FOREIGN AND COLONIAL.

FRANCE.—The Société Centrale des Architectes has appointed its council and staff for 1895. M. Charles Garnier has been elected President, MM. Corroyer and Achille Hermant Vice-Presidents. MM. Boeswillwald, Daumet, and Charles Garnier have been appointed, by the Department of Commerce, members of the Jury to consider the designs for the 1896 Exhibition. The Jury will include thirty-one members, of whom ten are to be elected by the competitors themselves. The exhibition of the designs is expected to be open in the course of next week. Thirty-five designs have been sent in competition for the new asylum proposed by the municipality of Paris at Ville d'Evard. Among the competitors are MM. Courtois-Suffit, Brénon, Roussel, Follin, and others. The Prefecture of the Seine is about to open an inquiry (as prescribed by law) in regard to the construction of a large penitentiary at Fresnes-les-Rungis, to replace the prisons of Mazas, La Roquette, and Ste. Pélagie.—Next week there is announced, at the Ecole des Beaux-Arts, a public exhibition of the works of the sculptor, Joseph Chéret, who died a few months ago.—The Demont-Breton, who has recently received the decoration of the Legion of Honour, has been elected president of the "Union des Femmes Peintres et Sculpteurs," in place of M. Léon Bertaux, who has resigned.—The inauguration of the new buildings for the Faculté des Sciences at the Sorbonne, which were to have taken place last week, has been postponed.—The Municipality of Paris has made definite arrangements for the organisation of the Musée Galliera and the museum of artistic collections which is shortly to occupy the Ville de Paris Pavilion at the Champ de Mars. It has been decided that the Musée Galliera will be essentially a museum of industrial art, and will contain among other things the fine collection of tapestries belonging to the City of Paris, which is valued at many millions of francs. The Pavilion "de la Ville" will be reserved for works of painting and sculpture, sketches and sculpture models, works purchased at the annual salons, &c., the whole being intended to be a preservative collection of Parisian art in the nineteenth century.—A competition has been opened by the Archbishop of Toulouse for the reconstruction of the church of St. Germaine at Pibrac.—The Municipal Council of Lyons has decided that the monument to President Carnot should be erected on the place de la République.

#### MISCELLANEOUS.

ARCHITECTURAL ASSOCIATION. DISCUSSION SECTION.—The third meeting for the present session of the Discussion Section of the Association was held at 55, Great Marlborough-street, on the 12th inst., Mr. W. Henry White in the chair. A paper was read by Mr. Theo. Moore, A.R.I.B.A., entitled "How shall we show our Work to the World?" A discussion followed, in which Messrs. Satchell, S. B. Beale, Greenop, Hopkins, Stockdale, and Garbutt took part. The special Visitor, Mr. E. W. Mountford, F.R.I.B.A., having criticised the paper, the usual votes of thanks were passed, and the proceedings terminated.

MEMORIAL TO MR. OLIVER HEYWOOD, OF MANCHESTER.—A statue of Mr. Oliver Heywood, a Manchester merchant and philanthropist, was unveiled on the 11th inst. at Manchester, by the Bishop of Manchester. The statue is the work of Mr. A. Bruce-Joy, and consists of white Sicilian marble, art, and rests on a granite pedestal. The statue has been erected by public subscription, at a cost of about 2,600l. The effigy stands at the southern end of the square, facing the Town-hall.

DOMESTIC WATER CISTERNS.—The need for regulations requiring the covering and cleansing of domestic water cisterns is amply demonstrated in the statements which Dr. Waldo, the Medical Officer of Health of the parish of St. George-the-Martyr, Southwark, has made in his annual report for 1893. He furnishes an abstract of a report which he presented after enquiry made into the conditions of the cisterns attached to the forty-one "model" dwellings scattered throughout the district. These cisterns, for the most part situated on the roof, were often imperfectly covered, and were in



most cases within a few feet of the openings of the soil-pipe ventilators. Not only was this danger in question, however, for in addition the state of the contents of these receptacles was frequently filthy, the water being covered with mud, and in some instances decayed vegetable matter lay two inches thick along the bottom, or the sides of the cisterns were coated with slimy filth an inch thick. Apparently private dwellings were no better, and here too the cisterns were often placed over water-closets or near dust-bins in the front areas. It is pleasing to note, therefore, that the Vestry have adopted by-laws under the Public Health (London) Act, 1891, with regard to the covering and periodic cleansing of house cisterns; but, judging by what Dr. Waldo says, the enforcement of the by-laws so adopted will be no light matter, and will call for close supervision for some time to come.—*The Lancet.*

**AN ARCHITECT'S CERTIFICATE BOOK.**—Mr. Mowbray A. Green, A.R.I.B.A., has brought out a very useful book of forms for architects' certificates for payments to contractors. The pages are arranged with counterfoils, in the same manner as a cheque-book. Both on the certificate-form and on the counterfoil are blanks for recording the name of the client on whose account the payment is made, and the number of the certificate; the counterfoil and the certificate have also each the same page number. The certificate is drawn out so as to show the sums already certified for (if any), the amount certified for on that particular form, and the total paid up to date. The certificate-form includes a receipt-form to be detached and returned, containing the statement of the place at which the work was done, and a blank for filling in the number of the certificate, the printed being given "in respect of certificate No. —." The whole will be a great assistance towards a clear record of payments, the whole information being retained by the architect on the counterfoils which remain in the book. Index-pages are provided. The title is "Architects' Certificate Forms: Arranged by an Architect," and the book is printed and published by Mr. Ernest W. Savory, Cirencester.

**SANITARY INSPECTORS' ASSOCIATION.**—In connexion with the course of lectures and demonstrations arranged by the Sanitary Inspectors' Association for sanitary officers, Mr. E. Tidman, C.E., delivered the first of two lectures on "Modern House Drainage," at St. James's Hall, Piccadilly, on Saturday last. Mr. Thomas, of Brompton, the Chairman of the Association, presided. The lecturer first enumerated the main principles of modern house drainage as pretty generally agreed upon by those most conversant with the subject, and which are in common use throughout London and the country where modern drainage is applied. It was regrettable, he said, that the County Council had not embodied in some of the recent Sanitary Acts provisions for enforcing a uniform system throughout London with reference to drains and connexions below the surface. Great praise, however, must be given to the Council for securing uniformity by-laws with regard to above-ground sanitary fittings, and with the exception possibly of the indefinite description of the quality of the soil-pipes, except within houses, these new by-laws left little to be desired. If the model by-laws of the Local Government Board, slightly modified, were adopted in London, a step in the right direction would be taken without much expense or trouble to house-owners, and uniformity would be secured. In view of the lectures on "Details of Plumbing," which are to be given in January by Mr. Fairchild, Mr. Tidman said he proposed to devote his attention particularly to underground and surface-work. He divided his subject into two main heads, namely (1), town-house drainage, and (2) country-house drainage, the first of these dealing with the work of drainage construction with the outfall into sewers, and the second with the outfall into cesspools and other forms of disposal, and with the treatment of sewage from country-houses. He proceeded to deal in considerable detail with the first of these divisions, referring, in turn, to sewers and sewer-connexions, interceptors, inspection chambers, gullies, grease-traps, and surface-inlets, ventilation and air-fush, spongyonage, drains, drain-ties, drain-cleansing and flushing, combined drainage of dual system of drainage, and subsoil drainage. The lecture was of a very practical character, and contained many useful hints to those engaged in the work of house-drainage; it was illustrated by a number of diagrams and models. Mr. Tidman will deliver his second lecture on the 2nd inst.

**A ROMAN VILLA AT DARENTH.**—A discovery of some archaeological importance, says the *South Eastern Gazette*, has been made within the last few days at Darenth, in Kent. Considerable remains of Roman tiles were noticed on the surface of a field beside the river to the south of the church, and tentative diggings were made, with the result that about a foot below the surface remains of Roman foundations were met with. The space now enclosed as the present limits of the exploration is a square measuring 100 yds. on each side. There is still a good deal of clearing to be done in this area, but what is quite obvious at present is that we have the foundations of a quadrangular building, with its outer walls made of flat nodules set in mortar and

placed with plaster, the walls measuring usually 2 or more in thickness. The inner walls are much less substantial, and seem, in some cases, as if they have been left hollow in the middle, while at the floor level each wall had a pronounced ornamental plaster moulding, concealing the angle formed by the floor and the wall. The floors of two of the rooms are paved with tesserae. Of the other rooms one still has its flooring of square red tiles about 8 in. in diameter, and in others traces remain. Along the north front is a row of five chambers of various widths, but all of the same length north and south—viz., about 27 ft. The largest is nearly square, the next about 18 ft. in width, and the three others from 6 ft. to 9 ft. wide. Beyond these, on the east, is a tiny room about 6 ft. square, and it is probable that other foundations exist in this direction. On the western side of this range of rooms is a large hall, which runs southward to an extent that cannot yet be determined, with a width of about 17 ft. Abutting on the outer wall of this hall is a small chamber that is conjectured to be the bath, from the proximity of the hot-air passages, which are here extremely solid. A kind of caseway, formed of tiles laid flat in courses, runs due south, beginning at about 35 ft. from the back of the row of rooms on the north. At one side of the caseway is the base of the wall, and on the other a channel. Following this to the southward it was found to communicate with a semicircular chamber, about 6 ft. wide. Very few small antiquities have been found, some fragments of bronze armlets, chains, a so-called hippopotamus, and small coin of Tetricus, &c., but broken pottery is found in abundance.

**PLUMBERS' COMPANY.**—At the annual banquet of the Plumbers' Company held at Goldsmiths' Hall on the 4th inst., Dr. Thorne Thorne, in proposing the toast of the "Public Health and the Plumber," based his remarks on the suggestion afforded by the device appearing on the menu card. He said:—"On the front page of this card there is a tree. It is growing without any visible beginning—any root. I suppose that that signifies that the origin of these ancient companies goes back so long past that it is impossible to trace it. Attached to the tree is a scroll on which are various words. The first is 'Workmanship.' I have been working in connexion with sanitation for many years, and I know that if there is one thing more than another that we feel confident about, it is that the public health is closely identified with good workmanship, especially in plumbing. It is one of the first aims of this company that all plumbers should be men whose work shall be good. You don't want that men shall be mere mechanics. Here I notice that the next word on the scroll is 'Education.' You desire that workmanship should be based on real education. Then comes 'Examination.' Whatever disadvantages may attach to examinations there is no other method by which the quality of the education can be tested. Next we have 'Registration.' I venture to say that the registration of plumbers throughout the country has already been conducive to a vast amount of good, and has tended to the improvement of the public health. And here, branching off at the top of the tree, is 'Sanitation,' and that is really the outcome of your work. To maintain the highest standard of public health it is really necessary that your Association should continue its good work." The names of Mr. Charles Hudson, Chairman of the Board of Examiners, and Mr. James Hoos, President of the United Operative Plumbers' Association of Great Britain and Ireland, were coupled with the toast. Mr. Hudson, in his reply, emphasised the importance of apprenticeship in the plumbers' trade, and referred to the objects of the plumbers' classes held in various districts being to improve the knowledge of those who had daily experience in the trade, and further alluded to the examinations held by the Company, disclosing the fact that men are frequently applying for registration as journeymen who are found to be unable to do the most simple part of the plumbers' work, and those practising as masters to be absolutely ignorant of the most elementary principles of sanitation. Mr. Hoos, on behalf of the Operative Plumbers of the Kingdom, expressed the utmost sympathy with the objects of the Company, and the desire of the workmen to uphold the credit of the plumbers' craft.

**THE SANITARY INSTITUTE.**—At an examination for Inspectors of Nuisances, held by the Sanitary Institute in London on 7th and 8th insts., 112 candidates presented themselves. Questions were set to be answered in writing on the 7th, and the candidates were examined *word over* on the 8th. Sixty-eight candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of sanitary inspectors.

**SEWERAGE SCHEME, FORTISHEAD.**—The Portishead Local Board has received the Local Government Board's sanction to borrow £14,000, to carry out the works in connexion with the proposed sewerage scheme; £12,000, to be repaid within thirty years, and £2,000, within fifteen years. The works include eight miles of sewers of various sizes, a sea outfall, 136 manholes, at an average depth of 11 ft. 6 in., about 100 iron ventilating-shafts, air compressing station with gas-engine, air compressors, cottage for attendant, ejectors, air-mains, &c. Estimates will shortly be invited for the

carrying out of the works, as it is proposed to commence operations without delay. Mr. T. J. Moss-Flower, A.M.Inst.C.E., Bristol, is the Engineer.

**SEWERAGE WORKS, LEYTON.**—A Local Government Board inquiry was held recently at the Town Hall, Leyton, by Colonel Henry Luard, R.E., in reference to the application of the Leyton Local Board for sanction to borrow £6,384, for works of sewerage. The plans, sections, &c., of the proposed works having been explained by Mr. W. Dawson, A.M.Inst.C.E., the Board's Engineer and Surveyor, the Inspector proceeded to view the district proposed to be sewered. As a large part of the proposed sewers will of necessity be under flood level, special patent-jointed pipes have been provided for.

## LEGAL.

### DISPUTE AS TO ANCIENT LIGHTS AT SOUTHFIELDS.

The case of Slack v. Richman and Smyth came before Mr. Justice Stirling in the Chancery Division, on Thursday and Friday, the 6th and 7th insts. The plaintiff, Mr. J. T. Slack, who resides at Ashley Lodge, Wimbeldon Park-road, Southfields, claimed an injunction to restrain the defendants from erecting, or carrying out, or permitting to be carried out, any wall or building on the land lying to the south-west of his premises, Ashley Lodge, in such a way as to obscure his ancient lights. There was also a claim for damages.

Mr. Graham Hastings, Q.C., and Mr. Peterson were counsel for the plaintiff; Mr. Grosvenor Woods, Q.C., and Mr. Boon represented Mr. W. J. Richman, who resides in the Wimbeldon Park-road, and was the builder of the wall in question; whilst Mr. Kan appeared for Mr. H. W. Smyth, who resides at 2, Seymour-road, Southfields, who was the owner of the land on which the wall was being erected.

Mr. Hastings, in opening the plaintiff's case, said that Ashley Lodge had been built about forty years, and the plaintiff had enjoyed all that time an uninterrupted view over the land in question. On the ground-floor, up to 1873, looking southward, there were the dining and drawing-rooms, which looked out on the ground. At a distance of 9 ft. from the south-west wall of the plaintiff's premises was the boundary-wall which separated the plaintiff's premises from orchard land belonging to Mr. Smyth. That boundary-wall was only 4 ft. 6 in. in height. In 1873 and the early part of 1874 the plaintiff's father built a conservatory, which was completed by March 4th in that year, and it was the windows of that conservatory that were now obscured by the wall in question.

The plaintiff, in giving evidence, said that he used to be able to see, from the windows of the conservatory, Southfields station, which was nearly half-a-mile away. He first saw the land being measured out for building in June last, and complained to Mr. Smyth, whom he told that the conservatory had been built for over twenty years. He did not say to Mr. Smyth (who produced plans of the houses he intended to build) that if the houses were of a lower class he would not object. He saw the wall in question being erected in July last. As it now stood it did not interfere with his lights, but if it were erected any higher it would do so.

Mr. Grosvenor Woods: You have two old windows—the dining and drawing rooms—looking into the conservatory?—Yes.

And if no building were erected on this ground which would be above a line of 45 degrees, taken from the sill of those windows, do you suggest that the light of those rooms would be in any way obstructed?—I have not considered the point, and I do not know what 45 degrees would be.

By his Lordship: The conservatory was about 30 ft. long and 9 ft. broad.

Mr. Kan: Did you ever object to Mr. Smyth building upon this land before the writ in this action was issued?—I did object.

When? When I told him he would spoil my ancient lights.

Mr. Tanner, a barrister, gave evidence as to residing at Ashley Lodge from September, 1881, to September, 1890. There was certainly not much light in the sitting-room, but quite enough for the purposes of sitting. There was no interruption of the light to the conservatory all the time he resided at Ashley Lodge.

Mr. Banister Fletcher, architect and surveyor, said that, in his opinion, the buildings when erected would intercept the light coming to the plaintiff's dining and drawing rooms.

For the defence, Mr. Bartlett, architect and surveyor to Mr. Smyth, said that if the building erected was not above a line of 45 degrees taken from the sill of the windows of the dining and drawing rooms, the light would not be obstructed. In his opinion the cherry and pear-trees had intercepted light to some extent. Mr. Richman had written to him telling him of the injunction applied for by the plaintiff, and he (witness) wrote back saying that Mr. Slack had no ground for complaint.

Henry Strong, builders' foreman, said he saw Mr. Smyth's land, before it was cleared for building, at the end of June. There were plum, pear, and cherry-trees close to the plaintiff's conservatory,







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# The Builder.

VOL. LXVII. NO. 2707

DECEMBER 22, 1894.

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### Siamese Sacred Architecture.



HE temples dedicated to the celebration of the Buddhist religion throughout the Indo-Chinese peninsula, although they all present some features indicative of their common origin, nevertheless show in their architectural development very distinct differences characteristic of the various nations that have erected them. Amongst all these nations the sacred edifices of the Siamese are eminent for the distinctiveness and persistency of their type, whilst it happens at the same time that few European architects have had the opportunity of devoting to them the study which they undoubtedly deserve.

Foremost amongst all the monuments of Siam for grandeur of conception and originality of idea come those of the old Khmer, or Cambodian races, magnificent examples of which still remain in the ruins of the Angkor Wat, as well as others in the neighbourhood of the great lake of Tuli Sap in the Mekong valley, which may form the subject of a future article. Those of Siam proper in the Menam valley, to which the present article is devoted, come perhaps second to the above in point of artistic merit. There is a marked similarity between some, especially the older ones, of the Siamese monuments and those of Cambodia, and this influence is probably attributable to the ancient suzerainty of Cambodia over Siam, and to the continual intercourse carried on between the two nations.

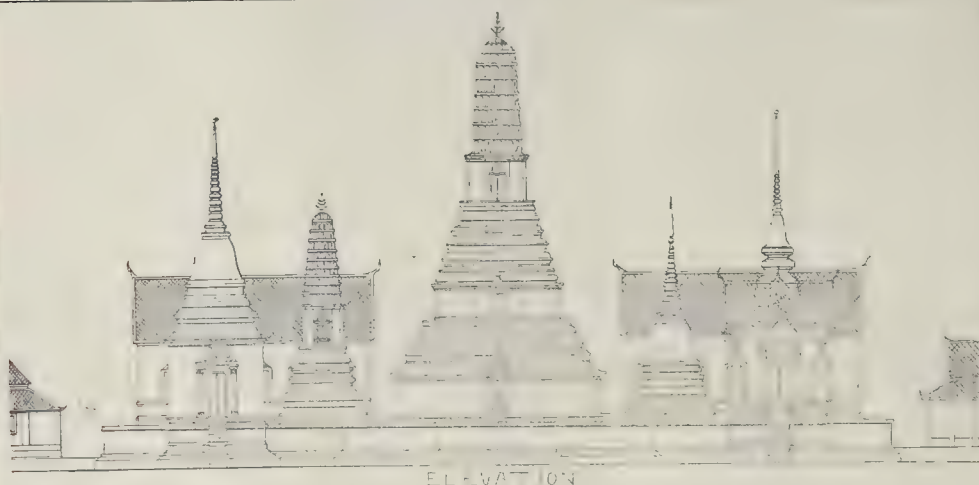
Siam is the only one of the Indo-Chinese kingdoms that, from the very commencement of its intercourse with Western nations, has always been freely opened to them without the least attempt at exclusion. Notwithstanding this fact, it has preserved its national characteristics utterly unmodified by European influences until quite recent times. Under these circumstances a description of the Siamese religious edifice, or Wat, cannot fail to be of interest.

The Siamese Wat—strictly speaking the Buddhistic Monastery of Siam—consists always of a number of separated buildings,

surrounded by a wall or fence; one of these is always a temple for the worship of the principal representation of Buddha, usually a recumbent figure on a central altar; another is a large hall for the purpose of preaching, and a smaller one in which the bonzes or priests offer up their lengthy prayers. There are also a number of open pavilions called *Santi*, built in a style resembling somewhat the Chinese—houses either of brick or of wood—which form the residences of the bonzes; and finally, and most conspicuous of all, the *Prachadi*, or sacred spire.

The last-named are the most characteristic features of a Wat, and most typical of Siamese architecture; they are pyramidal pinnacles of solid masonry, of all sizes, varying from a few feet to some four or five hundred in height. They are dedicated to Buddha, and have been erected by pious men desirous of thus acquiring merit in the next world, in common with all gifts for religious purposes, for *tham bun* (literally merit-making). Some are supposed to contain relics of Buddha or other objects of religious importance. In the course of centuries the original form of the *prachadi* underwent a series of transformations, which although gradual, have resulted in the evolution of an outline markedly different from that which they bore at first. The various stages of this evolution can be traced in the ruins of towns belonging to successive epochs, such as those of Sokothai, Nopaburi, and Ayuthia, until we come to the modern temples of Bangkok, only recently completed. Originally these *prachadi* were intended to symbolise universal creative powers, and their phallic origin and meaning is perfectly and realistically obvious in many of the earlier monuments; in the modern ones, as already said, the outline is that of a slender tapering spire. Their horizontal section is very variable, round, octagonal, rectangular, and rectangular with bevelled corners, being the predominant shapes; the latter form is especially characteristic of the ancient pinnacles that still exist in a more or less perfect state of preservation amongst the ruins of Ayuthia. Our knowledge of the older Siamese architecture is so largely obtained from the ruins of this, the ancient capital of Siam, that it merits a few words of description.

Ayuthia lies on the Menam river in lat.  $15^{\circ} 19' N.$  and long.  $100^{\circ} 6' E.$ , about fifty miles to the north of Bangkok. The modern town contains some 30,000 inhabitants, living principally along the banks of the Menam, and of the smaller creeks which intersect the islands, upon which the principal portion of the old city was situated. Most of the houses are of wood or bamboo, and a considerable proportion of the population lives in floating houses moored near the banks of the above-named streams. The town proper was founded about the year 1350, on the site previously occupied by a number of small villages which had grown up under the empire of Cambodia, to which this portion of the country appears to have originally belonged. In consequence of the frequent onslaughts of the Siamese or Thai, who then occupied the kingdom of Sokothai on the north of this country, and of the Peguans, the Cambodian inhabitants abandoned it, and it was occupied by the Siamese, who then appear to have consolidated their power throughout the whole of what is now Siam proper, and to have erected their capital on this spot. Tradition and the extensive ruins still to be traced here, combine to show that Ayuthia must have been a large and extremely flourishing city, as would be expected for the capital of so important and powerful a kingdom. Ayuthia remained the capital of Siam for over four centuries; it was attacked by the Burmese who invaded Siam, and after a fierce struggle conquered and completely destroyed in 1767. It was only after its destruction and after Siam began to recover from the effects of this disastrous invasion, and reasserting her power, drove back the Burmese, that the present capital of Bangkok was founded, so that the latter city is little more than a century old. Of all the once flourishing city of Ayuthia there is nothing now remaining except a pile of ruins, chiefly of the religious monuments. It must not be forgotten that in these tropical countries, large cities, including even important edifices, are constructed chiefly of wood and bamboo, whilst the exuberant forces of a profuse vegetation, aided by great heat and a heavy rainfall, are powerful agents of destruction, which alone can in a very few years obliterate all traces of human occupation. Many of these ancient temples, and even their sites, however, are held in high



ELEVATION



PLAN

Scale to Elevation 1" = 10' 0"  
 Scale to Plan 1" = 10' 0"

Type of a Buddhistic Monastery or Wat.

1, 2, 3. Stupa spires, *Prachadi*.  
 4. N. of the Wat.  
 5. Landing pavilion, *Santhi*.  
 6, 7. Temples.

8, 9, 10. Open pavilions, *Santhi*, used for preaching, as schools, and as resting-places for travellers.  
 11, 12, 13, 14. Houses for the bonzes, and for their servants.  
 15. Place for the cremations. a. Altars.

reverence by the Siamese, so that their complete destruction has been averted. Moreover, it is highly probable that the Burmese, being themselves Buddhists, would not dare to utterly destroy the sacred edifices in which their co-religionists worshipped, and which they themselves would most likely be bound to respect. Some of the least injured have been repaired or maintained in a fair state of preservation, and close by them, on the ancient sacred sites, new temples and houses for the bonzes have been erected, although in too many cases they have been deserted and abandoned to the encroachments of the rapidly-growing, impenetrable jungle.

The ruins of the numerous *wat* are still, however, to be found covering an area of many square miles; the *prachadi*, some of which are of great height, may often be described at long distances, their tapering shafts rising conspicuously above the dense mass of jungle vegetation, and overtopping by far the highest forest trees. They are for the most part detached, but sometimes are erected on a common base, symmetrically disposed, the highest in the centre, flanked on either side by one or more lesser ones. They are entirely built of large-sized bricks of admirable quality, the average size of one of these brick blocks,

being 30" x 18" x 10", and are laid in an excellent mortar, the precise composition of which is not known. Towards the end of last century, some Siamese nobles attempted to remove some of these bricks to Bangkok for the construction of the walls of that city, but it was soon found that the task of detaching the bricks from their bed of mortar was too laborious, and the attempt was abandoned. In spite, however, of the excellent quality of the materials employed, the forces of Nature, aided by the neglect of man, are doing their work of destruction with great rapidity; and it is hard to realise, when looking at these mutilated ruins, that only a century and a half ago, all these temples were in perfect preservation and thronged with thousands of faithful worshippers, who came from all parts of the vast kingdom of Siam to prostrate themselves at the feet of Buddha.

The *prachadi*, as consisting of solid masonry, have resisted better the various forces of destruction that surround them than have the temples proper, all of which are now in a state of complete ruin, no vestige of the roofs remaining, and the walls, where still standing at all, shattered and broken down, leaving vast gaps through which the mutilated statues of Buddha may be seen, exposed to the same destructive

influences; whilst the houses, once the resting-places of thousands of yellow-robed priests, now serve at the utmost for the shelter of some wild beast of the forest.

Remains of colossal statues are often to be found, some in a sitting attitude, others recumbent at full length. They are generally constructed of bricks, and were often covered with plates of beaten metal, portions of which are still found adhering in places to the figures. The thickness of this plating varied from that of a sheet of paper to nearly three-quarters of an inch. Some statues are of stone; other statues again appear to have been made entirely of bronze, in the casting of which metal the Siamese artificers excelled, as is proved by many specimens of their skill which have been recovered. Tradition states that in the casting of one famous statue, said to have existed at Ayuthia, 2,500 lbs. weight of copper, 2,000 lbs. of silver, and 400 lbs. of gold, were employed. It appears fairly well ascertained that the Siamese, like the Japanese, were sufficiently skilful metallurgists to be able to appreciate the advantage of adding small quantities of the precious metals to their bronzes in order to produce the beautiful patina for which Oriental bronze is celebrated.

It is said that many treasures of great value lie buried beneath the ruins of the



temples of Ayuthia, especially under the altars; explorations with a view to recovering these have often been made, but never systematically. They are now still carried on from time to time furtively by some enterprising native, and it is said that these labours are occasionally rewarded by some find of importance; but as such work is always done without authorisation, it is obviously impossible to obtain any definite information as to the results.

One of the most important of the ruined temples of Ayuthia is Wat Yai, situated about two miles from the centre of the town. Here there is still standing a magnificent *prachadi*, surrounded by a number of smaller spires; its base is very broad and its height fully 400 ft. As in all these monuments, the lower portion consists of a series of platforms connected by flights of stone steps. The main lower platform is reached by four such stairways, the steps being steep and uncomfortable. The platform forms a broad gallery surrounding the central pile, which carries a second platform, whence access is similarly gained to a third one, whence a magnificent view over the ruins of the town, set in a frame of dense dark jungle, is obtained. From this third platform the huge central spire towers upwards; the latter is pierced by two narrow corridors at right-angles to each other, which thus connect the opposite sides of the platform. In the centre where these corridors intersect, there is a huge vaulted chamber, which forms a sanctuary. Upon a crumbling altar there is still resting a colossal figure of Buddha, made of brick covered with cement, the principal statue being surrounded by a number of smaller ones. In spite of neglect and decay, the majesty of this colossal monument cannot fail to impress the beholder, whilst the profound silence reigning all around heightens the feeling of solemnity. Even in their ruins, the temples of Ayuthia display an austere magnificence that well befits the religious monuments of a great nation.

In strange and almost startling contrast with the crumbling ruins of deserted Ayuthia is a spot called Ban Pahin, some five miles only lower down the river Menam, which forms the favourite resort of the present King of Siam. It consists of two islands lying in the middle of the river; on the larger one are situated a royal palace with its dependencies, a beautifully laid-out garden with numerous pavilions, towers, bridges, &c., all built in various styles of European architecture. On the smaller island, facing the palace, a royal *wat* has been erected, consisting of a small temple built in German-Gothic style, all the numerous other buildings belonging to the *wat* being of the same type of architecture. This unique *wat* has now been completed for some ten years, and the people of the country are gradually getting accustomed and reconciled to so flagrant a violation of their religious traditions. Needless to say Siam is an absolute monarchy, and it seems that nothing less than such royal prerogative could have established so heretical an innovation; as it was, even orthodox Buddhism in Siam was gravely scandalised. From the top of a tower in the King's garden an excellent view of the whole of Ban Pahin can be obtained, and there are such an extraordinarily striking scene is displayed. On the north the sacred spires and solemn ruins of Ayuthia arise towering above the dark mass of jungle, whilst the huge mountain chains still farther northward form an appropriate background to the picture. All round, on every side, the belt of jungle extends over the vast plain traversed by the mighty Menam rolling onwards to the sea, whilst to the southward extensive areas have been cleared and devoted to the cultivation of padi, the staple food of the Siamese. And amidst all this wealth of tropical vegetation, to which an occasional glimpse of a herd of elephants gives local colour, the traveller sees at his feet a palace in the style of the Italian

Renaissance, English gardens, Swiss chalets, and small buildings of all possible *rococo* styles, with opposite him what looks remarkably like a small German village, with a Gothic church and high bell-tower! Nowhere else probably can such a strange and fantastic medley be seen.



Painted Dragon from a Siamese Temple.

#### A ROMAN VILLA AT DARENTH, KENT.



DISCOVERY has just been made which is likely to prove of considerable archaeological interest. It has long been known that Roman remains of some description were lying buried in a field to the south of Darenth Church, Kent, for, on the testimony of some local authority at the time, the spot was marked years ago on the ordnance maps. Nothing, however, was apparent above ground, nor did any inequalities in the site warrant the belief that any foundations existed there. Nevertheless, when the summers were dry, and attentive examination was given to the corn growing in the field, it would be noticed that there were peculiar irregularities in the crop, and that these were in regular lines, crossing and recrossing one another. A few years ago a steam-plough was set to work in the locality, but it has now been remembered that some obstacles in the ground broke the instrument, and its use was discontinued. Still later, in clearing out the sloping bank of the river Darenth, which skirts the field, for watercress-beds, some foundations were met with in the water, and Roman tiles and mortar were thrown up with the excavated soil.

A fortnight ago, Mr. E. A. Clowes, whose old mansion, bounded by still more ancient red-brick walls, is not far from Darenth Church, was tempted to make a tentative excavation on the supposed site of the buried remains, in concert with his friend, Mr. Marchant. Having obtained leave of the tenant, Mr. J. M. Burtenshaw, a trial hole was dug. It resulted in a portion of a Roman pavement of small cubes of red brick being laid bare, but a small depth below the present ground level. Curiosity being naturally excited, it was determined to undertake some systematic exploration, which the nature of the field now lying bare after the autumnal harvest very much favoured. Consultation and conference with some known antiquaries having taken place, it was resolved to invite the aid and help of Mr. George Payne, F.S.A., of Rochester, who at once devoted himself to the task of superintending the proposed work. A body of agricultural workmen, who were glad of the unexpected work in this dull season of the year, was readily obtained, and set to work in a space fenced in for the undertaking. The foundations of massive walls were speedily encountered, and the excavators followed them from point to point. It soon became apparent that the building, the site of which was thus being laid bare, was of great extent, and room after room, baths and corridors, were met with in all directions.

We accepted a private invitation on Satur-

day last to inspect the discovery, and were greatly rewarded by the examination. A portion of the field 300 ft. square was fenced off, and within this a large number of excavators were at work. The extent of the building may be judged by the fact that many of the walls had been traced quite up to the boundary, and their extremities had not been found, while it was clear that they extend beyond the enclosure. Indeed, their extent may prove to be enormous, for it is now an established fact that the field in which the steam-plough could not be used is not where the work is now going on, but in the adjoining one. The remains laid bare lie fairly east and west, the walls being at right-angles to each other. To the north is a well-defined hypocaust, with the entrance from an adjoining chamber, formed by a small semi-circular arch with neatly-turned flat tiles, having smaller ones arranged as a label around it. The flues spread out in the hypocaust, and are carried by circular pipes in the walls upwards to heat the chamber above once existing. To the south a large L-shaped room practically enclosed the hypocaust, and here was a detached pier of masonry. Beyond it two large rooms were apparent by the floors still remaining, of red tesserae. They had been divided by a thin partition, possibly of stud-work, the skirting of plaster shaped to a quarter round still remaining on each side with the clearly-defined thickness of the partition between them. Elsewhere the skirtings were very apparent, and in several places the walls still remain to a height of more than a foot with the plaster still remaining upon them—indeed, in more than one place, the plastering was found remaining although the wall once behind it had been removed for its materials. Beyond these two rooms, still going west, is a wide corridor 42 ft. 7 in. long, from north to south. To the east of it is another hypocaust, and to the west, parallel with the corridor, is a wide range of walling covered with remains of small tile pillars (*pylæ*), which once supported the floors of the rooms above, affording space for the passage of hot air from the adjoining hypocaust. Still going west, at the south end of the corridor, a fine series of baths have been laid bare. These are at different levels, one lower than the other, there being a descent to it by five cemented steps, the whole width of the apartment, but it is possible that the present depth is of later work. This is the case in the bath to the east, where the original floor-level is apparent. But there is a curious trench in this bath, as if for the feet only of the bathers. The bath with the steps has had a flooring of large flat tiles, of which a considerable portion still remains, and the impressions of those removed are visible in the mortar-bed.

The walls are here and there still covered with plastering, which preserves its deep red colour, and the rounded skirtings are also visible. Beyond the baths, the excavations extend within easy distance of the boundary, and at closing time the men were unearthing what appeared to be another hypocaust.

To the south of the range of buildings thus described, a width of the site appears to be clear of buildings, but a thick wall, built of two thicknesses and filled in with rubble, has been laid bare from its eastern limit. It extends, apparently, without a break for about 90 ft., where it is stopped by the apex of a semi-circular apse. The side walls of the building of which it formed a portion have just been laid bare, but they have not been traced. It is likely that they extend beyond the boundary. At a right-angle, or nearly so, to the thick wall is another, not so massive. It has been followed for a length of about 80 ft., and its eastern end found, but the western termination has not yet been reached, although it has been laid open for about the same length. It would seem from present appearances that this wall is connected with another series of rooms, while beyond it on



each side are other apartments, now being excavated.

The walls are built of flint with a very liberal amount of flat tiles, some of which are of large size, one which we measured being 15 in. by 11½ in., and 2½ in. thick. The mortar is fairly good; pounded brick has been used in it only here and there. A great quantity of coloured plaster fragments from the demolished walls has been met with, the colours being red, white, white with patterns of red, buff, and black. Great quantities of broken pottery, mostly of black ware, have been found, but at present no very remarkable fragments have been met with. Only a little red ware, pseudo-Samian, has been dug up; and there are many indications that the rooms laid bare are not the principal ones of the establishment. A few coins of Tetricus and Constantine the Great, small, third brass; many fragments of window-glass; a good glass bottle; a great many iron nails of large size; tools, spear-heads, oyster-shells in large quantities; and a few bone pins, are the principal articles that have been found at present the most interesting object being a piece of bronze with a pattern, the compartments of which are filled in with coloured enamel. In one part of the building there is a wide drain, formed of flanged roofing tiles, and elsewhere the arrangement for bringing the hot air from the hypocausts by square flue tiles is very perfect. The building has been roofed with large flat tiles of great thickness and weight, and the joints covered with small half-rounded tiles. The walls have been demolished systematically for their material, and all reduced to a similar level, which was doubtless that of the rubbish of the demolition. This is evidenced by the fact that only a few of the roofing tiles have been met with, which would not have been the case had the roofs fallen in. Abundant evidences remain of the use of the hypocausts by the black ashes, but there is no evidence, as is often the case, that the building met its fate through burning.

The results of the excavations thus far already enable some comparisons to be made with other well-known Roman villas. The fine villa in Spoonley Wood, Gloucestershire, recently described by Professor Middleton, is contained in an area about 190 ft. by 170 ft. The principal portion of the Chedworth Villa, in the same county, is within a space 110 ft. by 60; but there is a wing in addition, and perhaps there is another. The great villa at North Leigh, Oxfordshire, is very nearly the same size as the enclosure set out at Darenth, and no principal part seems to have extended beyond it. The Bignor Villa is about as large as the enclosed space. The Woodchester Villa, without doubt the finest as well as the largest that has yet been opened, has its principal portion in less than the enclosure, although its subordinate parts go out far beyond. It will thus be seen that the discovery at Darenth at once shows that it can be compared with the largest known examples, and that there is every probability of its exceeding them. On Saturday there were a good many visitors within the enclosure, but they served only to show the great size of the building laid open.

The site is easily found. It is about a mile and a-quarter from the Farningham-road Station of the London, Chatham, and Dover Railway. A visitor has to make his way to Darenth, where, on crossing the river, which is here in two streams, at the village, he had better proceed to the church. A path just to the west of it leads along the edge of the river to the field containing the site, where the mounds of earth thrown up by the excavators at once indicate the enclosure, which is about a quarter of a mile due south from the church. A fee of one shilling is charged for admission, which is devoted to the excavation fund, and for this sum the visitor is permitted to watch the progress of the excavations, every hour adding to the evidences of the extent of the remains. It may be added that Darenth Church,

shows clearly that all its oldest portions have been built with Roman materials, doubtless derived from the site now being excavated. The nave, from its height and its rude construction, in singular contrast to the early Norman chancel, is most probably of Saxon date. The east end is well known for its curious triplet of Norman windows. The south side and the south-west tower are of late twelfth century work, in which old Roman material has again been used. But the north-west and the north-east angles of the nave and the walling between them are all of Roman brick and flint. There is a rude doorway under the west window, blocked, and an ornamental Norman doorway, also blocked up, evidently an insertion, is visible in the north wall.

#### NOTES.

**T**HE terrible accident from the explosion of a boiler at the Henry Small Arms Company's works at Islington demands a most searching inquiry into the construction of the boilers at the factory in question, more especially as to the nature of the safety-valves fitted (we presume) to these boilers. With a properly-constructed automatic safety-valve such an accident ought to be impossible. Was the safety-valve properly automatic in its action? or was it one which could be interfered with by the man in charge, or left out of working-order through carelessness or indifference? In this case the unfortunate man who was in charge of the boiler at the time has lost his life, and we can have no evidence from him. But the boiler ought to have had a safety-valve so constructed as to render it safe under any circumstances. It is to be hoped that this point will be fully gone into at the inquest. It is probably only due to the fact that the explosion took place during the dinner-hour that many more lives were not sacrificed. The tale is a sad enough one as it is.

**A** SHORT discussion in the London County Council on Tuesday should be noted. A wall had to be built by the Works Committee of the Council for the Corporate Charities Committee. The wall cost 60*l.*, which in the opinion of the architect was at least 17*l.* too much. The matter came before the full Council on the report of the Committee that the whole amount should be paid. The long and short of this matter appears to be that the cost of labour was too great—in other words, that the Works Committee did not get a fair day's work for a fair day's wage. So far again as this particular work goes this means that the ratepayers have paid more under the new system of the County Council than they would have done had the work been executed by a contractor. We have abstained from condemnation of the new system till full facts were before us. But here we have the architect of the Council giving a distinct opinion that a particular piece of work cost one-fourth more than it should have done. If this is the case in regard to this piece of work, it is probably the same in regard to others, and if so, the ratepayers of London are being done out of their money by the Council, which does not, in this respect, appear to understand its business.

**T**HE last number of the *American Journal of Archaeology* (marked July-September, but only just issued) contains a paper of special interest to architects. It is by Mr. Rufus Richardson, of the American School at Athens, and deals with the "Stamped tiles of the Argive Heraeum." The stamped bricks of the Assyrians are well known, and bricks made by the Romans, and impressed with the names of the various legions by whom and for whom they were made, have been found all over Western Europe. Dr. Birch, in his "Ancient

Pottery" (p. 116), gave, about forty years ago, a list of similar examples of Greek stamped tiles. Little has been written on the matter since. The excavations of Olympia and Delos did not add much to the material, but at Lycosura a number of bricks were found bearing the stamp ΔΕΣΠΟΙΝΑΣ, i.e., "of Despoina," and similar stamps have come to light at the Peiraicus Tanagra, Amyclæ, Tegea, Elateia, Eretria, Megalopolis, and, most of all, at Pergamos. The tiles therefore of the Argive Heraeum, dealt with by Mr. Richardson, are by no means isolated phenomena. Those recently discovered are all fragmentary, but happily a tile exists in the Central Museum found by Stamatakis in the Hereum in 1878, which allows of the fragmentary inscriptions being easily put together into an intelligible whole. It runs as follows ΣΑΚΛΗΣ ΑΡΧΙΤΕΚΤΩΝ—Sokles, the architect. On another tile, found by Dr. Schliemann in 1874 at Chonika, about one and a half miles from the Hereum, the same inscription occurs, and below it ΔΑΙΜΟΝΙΟΙ 'ΗΡΑΣ, "the public property of Hera." The question arises, what precise purpose the tiles served? Mr. Richardson concludes from an examination of shape and make generally, that they are neither roof-tiles nor closed drain-tiles, but open gutter-tiles. The meaning of the word ΑΡΧΙΤΕΚΤΩΝ is an interesting question. From its use in various inscriptions it seems to have a very definite sense as "supervising architect," a man holding office sometimes for the erection of a particular building or (as at Delos) for a term during which he would supervise all buildings and repairs. He received, it is curious to note, usually a drachma a day; in exceptional cases as much as two drachmas—just the same, we learn from another inscription, as an ordinary mason got for working at a column. Yet the ΑΡΧΙΤΕΚΤΩΝ was a man occupying good social position, his office is responsible, and requiring special art knowledge and training. The officials in Greece certainly did not look for large remuneration; the branch of *ἐπιστάται* (overseers), with whom the architect was associated, gave their services free.

**S**WEDEN seems coming to the fore in the matter of excavations. Dr. Sam Wide, who is well-known in the archaeological world by his book on "Laconian Cults," has spent the summer exploring the great sanctuary of Poseidon at Kalauria. It is understood that he has been successful there, but no details are, at present, published. From Kalauria he went on to Aphidnæ in North Attica, a place of great mythological importance. The *Berliner Philologische Wochenschrift* (Dec. 15) reports that already substantial discoveries have been made which may throw some light on the "Mycenæ" question. Dr. Wide has opened a tumulus in which twelve graves have come to light of Mycænæan date; a quantity of vases have been found similar to those discovered at Thoricus, and more important still, a number of charred skeletons—one of these is the skeleton of a man of colossal size; his huge bones have been transported to Athens, where they are exhibited in the Museum of Physiography, and are exciting much attention. Besides the skeletons a gold necklet, gold earrings, armlets, &c., have been found. The Greek Archaeological Society proposes to follow up these tentative excavations and have the site thoroughly explored.

**I**N the recently-issued volume of the Historical Manuscripts Commission—namely, vol. iii. of the Portland manuscripts, there is to be found at page 132, a very curious example of the iconoclastic zeal of the Parliamentarians during the Civil War. Sir Robert Harley, of Brampton Bryan, in Hertfordshire, was a rigid Puritan, and he seems to have been entrusted with the task of destroying what he and those of



his views regarded as idolatrous things. We may give one or two extracts from these curious papers. The first is—"1644, April 19, Receipt for 6s. by Thomas Gast-away from Sir Robert Harley for three days' work in planing out some pictures at the Abbey," that is, at Westminster. Another is a receipt from the same person for work done on the outside of the north side of Westminster, including the hire of scaffolding for taking down statues of the Virgin Mary and other Saints. The various receipts are evidence of the most business-like destruction of statues, architectural ornament, and stained glass, not to mention the defacing and destroying of pictures and the sale of jewels from mitres and crosses.

IT is proposed to erect a memorial to Llewellyn, Prince of North Wales, and a suggestion has been made that it should consist of a monument in Cwm Hir Abbey, where as is believed his decapitated body was buried. That Cistercian monastery, dedicated to St. Mary, was founded for sixty monks in 1143, by Cadwallon ab Madoc, in a valley of Radnorshire. Matthew Paris records that Henry III. burnt the Abbey-grange and fined the abbot 300 marks in vengeance for the betrayal by a Cwm Hir monk of the garrison at Montgomery Castle to Llewellyn the Great. Having suffered much during the warfare carried on by Owen Glendower, its fortunes dwindled, so that it contained only three monks at the suppression, when it was valued at 28*l.* 17*s.* 4*d.* a year. The monastic buildings appear to have never been completed; the ruins are described in Caley and Ellis's "Dugdale" as comprising a structure measuring 236 ft. by 73 ft., some of the columns and arches whereof had been taken for repairing Llanidloes church in 1542, and other portions for Cwm Hir chapel. They removed further materials about seventy years ago for building a house close by. Lewis (1849) says that many fragments of ornamental carving, in freestone, were then lying about. Llewellyn (ab Iorweth) the Great, died 1240, in retreat at Aberconway Abbey, which he himself had founded, and was buried there. He had been a benefactor to Cwm Hir. His grandson, Prince Llewellyn (ab Griffith) met his death near Builth, 1282, in a foray with Edmund Mortimer's men. They brought his head to London, and set it on a pole at the Tower. His brother David's capture and execution at Shrewsbury in the following year, completed the conquest of the Principality.

THE "Ivy Lodge" estate, Fulham-road, the sale of which for building purposes we lately announced, merits passing notice as the home during many years of Rudolph Ackermann, print-seller and art-publisher, who first introduced into England, using it for illustrative purposes, Andree's mechanical process of lithography. The son of a coach-builder and harness-maker, and born at Stolberg, Saxony, on April 20, 1764, he followed his father's trade at Schneeberg and at Zend, and was a pupil in Paris of Carrossi, coach-builder. Migrating to London, he found employment with his countryman, Facius, conductor of the "Journal of Fashion," as a designer of carriages; amongst his work of that time were state-coaches (1790-1) for the Lord Lieutenant of Ireland and the Lord Mayor of Dublin. In 1795 he married an Englishwoman, and opened a print-shop at No. 96, Strand, corner of Beaufort-buildings. Thence he removed to No. 101 (*Ariston*) the "Fountain" tavern, and now the Divan, where he had revived the drawing-school established by William Shipley, who, in 1754, had founded the Society of Arts. In 1801 Ackermann patented a method for waterproofing paper and cloth, and erected a factory at Chelsea; in 1805 he designed Nelson's funeral car. Owing to the success of his publishing business he relinquished, in 1806, the

drawing-school, which, entered from Fountain Court, afterwards served for John Thelwall's British Forum. A few years later he set up a lithographical printing-press, engaging several writers and artists of repute, for his "Repository," 1809-28, forty-one volumes in four series, edited by F. Shoberl, and kindred publications.\* In 1827 Ackermann returned to No. 96, Strand (standing in a detached part of St. Clement Danes parish), which J. B. Papworth designed for him. He quitted Ivy Lodge—whither he had removed from Camberwell—in 1830, for Finchley, and dying there on March 30, 1834, was buried in the family grave, St. Clement Danes. As an instance of his many-sided enterprise, we may recall that he was one of the first to use gas for lighting, making it on his own premises in a machine Clegg made for him; nor should his philanthropic efforts to relieve his distressed countrymen after the wars of 1814-5, or generous dealings with French refugees in London, be unmentioned.

THE Report made to the Local Government Board by Mr. T. W. Thompson, upon an outbreak of diphtheria in the parish of Barnham Broom, within the Forehoe Rural Sanitary District, speaks better of the condition of the dwellings than some Reports of the same class, though their construction seems to be of a very primitive kind, most of them being built of clay, either clay lump or clay and stud; the roof surfaces are either thatched with straw or covered with tiles. The floors of the downstairs rooms are mostly tiled or bricked. In not a few instances evidence of dampness was met with. When we come to drainage and water-supply, however, it is the usual story. The cottages have neither drainage nor ash-pits, the slops, ashes, and house-refuse being disposed of upon the gardens, or thrown into holes there. For excrement disposal, the privy with brick-lined receptacle beneath or behind it is in general use. Many were found to contain a considerable quantity of liquid decomposing filth. They are emptied by the householders, who dig the contents into their gardens. Water is obtained from wells sunk into the clay, and provided with windlasses and buckets. Being only dry-stained, they are liable to admit water from the superficial layers of the soil, and in one or two instances such water was seen trickling into them. They are thus, of course, exposed to danger of pollution, and, as a matter of fact, chemical analysis has recently shown certain of them to be polluted. Thus, all the three wells by which Pockthorpe has hitherto been supplied, have been condemned by the County analyst as being polluted with sewage, and at the time of Mr. Thompson's visit water was being sent daily to this locality from another well a little distance off. Works were in progress with a view to remedying the defects of one of the Pockthorpe wells, but no action had been commenced with regard to the other two, neither had they been formally closed.

IN regard to the claims now often made on behalf of persons unemployed, that remunerative work should be found for them at the cost of the nation, the following trenchant remarks appear in the form of a letter in the *Times* of Wednesday, signed "Urbicus," and headed "The Independent Unemployed":—

"Mr. Keir Hardie, M.P., insists that there are

\* A list, compiled by the late Wyatt Papworth, includes the following: *Microcosm of London*, 1808-11, 3 v.; *Westminster Abbey*, 1812; *Oxford* 1814; *Cambridge*, 1815; *Winchester*, Eton, Westminster, &c. (the colleges), 1815-6—the text of these by Pyne and Combe, the plates by Rowlandson, A. Pugin, Nash, and others. Field and Walton (English lakes), Pugin and Gendall (the Seicel Westall and Owen (the Thames), J. G. von Gerning (the Rhine), and E. M. Grindlay (India), illustrated the "Pictureque Tour." The "World in Miniature," with 627 plates, was published, in forty-three volumes, 1827-6. Dr. Syntax first appeared as the "Schoolmaster's Tour" in Ackermann's "*Poetical Magazine*" 1809-11. The "Forget-me-not," begun in 1825, was continued by Schöberl until 1847.

over a million unemployed in the country. Mr. Keir Hardie's own constituents decline to accept relief works at less than trade union rates. Relief works are almost entirely unnecessary or unproductive works. The union rate of wages for unskilled labour is 6*d.* per hour of 48 hours per week, so that during the three winter months, say 13 weeks, each labourer would expect to earn (?) 16*l.* 18*s.*, which, multiplied by 1,000,000, would amount to 16,900,000*l.* But Mr. Keir Hardie says his million are skilled workmen; therefore 9*d.* per hour, over the same period, would mean 24,700,000*l.* Lord Rosebery is 'considering' the matter."

THE collection of drawings by Mr. H. B. Wimbush, now on view at the Fine Art Society's Gallery, illustrating scenes around the Public Schools of Winchester, Harrow, Eton, Rugby, Haileybury, and Marlborough, is well worth attention both on artistic and on other grounds. Many persons will, no doubt, be interested in these views of places connected with the schools where they have been or where their sons now are; and Mr. Wimbush's drawings have the merit of combining topographical care with artistic effect and treatment. He knows how to represent architecture in water-colour, and architects will find his drawings worth looking at. At the same gallery are some drawings by Mr. Percy Robertson of the Wey Valley and Charterhouse School. These have less of architectural interest, being chiefly concerned with landscape effect.

WE may draw attention to the fact that the series of illustrations of the Cathedrals of England and Wales, which has appeared in this journal, is now republished in a folio volume (see advertisement in the present issue). The volume is necessarily a somewhat costly one, and the issue is limited in number accordingly, but there may be a good many owners of private libraries or managers of public ones who may be glad to possess a complete volume of these illustrations in book form. As to the views of the Cathedrals, the method of execution, and the points of view selected, there will no doubt be differences of opinion, as there are differences of taste; but as to the plans at least we can speak with confidence. No such series of plans of the Cathedrals of this country, whether as regards largeness of scale or accuracy of detail, has ever before been published.

#### THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

*The London Building Act, 1894.*

THE ordinary meeting of the Royal Institute of British Architects was held on Monday last at 9, Conduit-street, Mr. F. C. Penrose, M.A. (President) in the chair.

Mr. W. H. White (Secretary) announced the decease of Mr. H. A. K. Gribble (Associate), architect of the Brompton Oratory, and of Mr. W. G. Coward (Fellow), of Sydney, New South Wales.

The President then read the following names of those gentlemen who had passed the recent examination qualifying for candidature as Associates:—

Percy Henry Adams, 65, Leadenhall-street, E.C.; Geoffrey Prater Armstrong, Parrock, Mount Nod-road, Streatham; Harold Bailey, Newark; Luke Barlow, Manchester; Charles Edward Bateman, Birmingham; Sydney Benjamin Beale, 3, Princess-street, Westminster, S.W.; Frederick Bligh Bond, Bristol; John Borrowman, jun., Hambledon, near Godalming; Harry Ebenezer Budden (Sydney, N.S.W.), Waterloo-place, S.W.; John Laurie Carnell, Thorpe Hamlet, Norwich; Henry Ascough Chapman, 48, Florence-road, Stroud Green, N.; Harold Edmund Church, 15, Upper Bedford-place, Russell-square, W.C.; John Fain Clark, 40, Baron's Court-road, West Kensington; Frank Berridge Cooper, 88, New Walk, Leicester; George V. Coster, Bournemouth; Percy Pavovich Cotton, 33, Agate-road, the Grove, Hammersmith; William Edward Vernon Crompton, Moot Hall Chambers, Wallgate, Wigan; Ernest Outram Cummins, 1, Nevden Mansions, Nevden-square, S.W.; John Cadwallader Dewhurst, Belfast; Archibald Campbell Dickie, 32, Gibson-square, Islington, N.; Samuel Stevens Doddridge, Tregarthen, Burnt Ash Hill, Lee, S.E.; Frank Brookhouse Dunkerley, Hurst Dale, Bowden, Cheshire; Frederick Ernest Pearce Edwards, Liverpool; Hyla Edward Elkins, 35, Cantlowes-



road, Camden-square, N.W.; Charles Septimus Errington, Newcastle-on-Tyne; Alfred Whitelock Field, Croydon; Herbert Phillips Fletcher, 29, New Bridge-street, Blackfriars, E.C.; William Adam Forsyth, 51, Goldhurst Terrace West, South Hampstead, N.W.; William Edgar Gauld, Aberdeen; George Gunn, Ayr, N.B.; William Hawke Woodbury Cottage, Thornton Heath, Surrey; Wilberforce Ernest Hazell, 15, Russell-square, W.C.; Alexander Robert Hennell, Oakwood, Mayow-road, Forest Hill, S.E.; Frederick Brice Hobbs, Tower Lea, Waterloo, near Liverpool; Robert William Horn, Glasgow; George Hubbard, 23, Finsbury-circus, E.C.; George Gilbert Irvine, Emperor's-gate, S.W.; Walter Robert Jaggard, 51, Westbourne Park-road, Bayswater, W. John James Joas, 118, Mallinson-road, Wandsworth Common, S.W.; Vivian Herbert King, 13, Eaton-road, N.W.; Henry Ernest Kirby, St. James's Palace, S.W.; Herbert Alfred Legg, Christ's Hospital, E.C.; George Augustus Bligh Livesay, Boscombe, Bournemouth; Alexander Paul Macalister, Cambridge; Arthur Ernest McKewan, Handsworth, Birmingham; Alfred Henry Mills, Sale, near Manchester; Herbert Jeffrey Palmer, New Malden, Surrey; Allan John Pinn, Exeter; Thomas Aloysius Pole (Brisbane, Queensland), 2, Great Coram-street, Russell-square, W.C.; Francis John Potter, Gardner House, Hampstead; Henry Ingle Potter, Beechcroft, Guildford; John Henry Price, Liverpool; Chester John Fye, 5, Corona-road, Lee, S.E.; Thomas Duncan Rhind, 9, Manor-terrace, Highbury, N.; George Oakley Scorer, Abercorn Lodge, Upper Hamilton-terrace, N.W.; George Patrick Sheridan (Dublin), 39, Guilford-street, Russell-square, W.C.; Charles Henry Smith, Old Charlton, Kent; Joseph Spain, Sunderland; Harry Tom Boden Spencer, "The Laurels," Bloomfield-road, Highbury, N.; James Greenwood Stephenson, 21, Hamilton Gardens, St. John's Wood, N.W.; Arnold Seaward Taylor, 151, Brixton-road, S.W.; Hubert William Walker, 44, Derwent Grove, East Dulwich, S.E.; Thomas Harry Weston, Bristol; Henry James Wise, 79, Mansfield-road, Gospel Oak, N.W.

The following were the names of those who had passed the Preliminary Examination:—

Charles Thomas Adshead, Stockport; Thomas Wilson Aldwinckle, "Saratoxa," Dacres-road, Forest Hill, S.E.; Henry Lennox Anderson, 6, Stratton-street, Piccadilly, W.; Percy John Atkins, Coventry; Ormrod Maxwell Ayrton, Chester; John Cecil Baines, Leicester; James Baird, Prestwick, Ayrshire; Thomas James Bee, East Finchley, N.; Alexander Godolphin Bond, Bristol; Andrew Francis Stewart Bryden, Glasgow; John George Neilson Clift, "Lansdowne," Thurlough-road, Balham, S.W.; Denis Conroy, Dublin; John Thomas Conroy, Scarborough; Cecil Wesley Councill, 21, Parliament-street, Westminster, S.W.; Alexander Cowie, Aberdeen; Arthur Stanley Cox, Sonning, near Reading, Berks.; John Ramsay Cox, Cheltenham; Charles Ford Dawson, Queen's-road, Barking; Basil Charlton Deacon, Rock Ferry, Cheshire; Wilfrid Thor Deacon, Rock Ferry, Cheshire; Walter Ernest Dobson, Gothic House, Chislehurst, road, West Hampstead, N.W.; George Dykes, Cathcart, Glasgow; Robert Edwin Eddison, 70, Kirkdale, Sydenham, S.E.; Henry Alexander Radcliffe Ellis, Selly Oak, Birmingham; Jacques Levy Embling, Reading; Harold Falkner, Farnham, Surrey; Horace Cowley Neeham Farquharson, 28, Leyland-road, Lee, S.E.; Frank Leonard Hodgson Fleming, 2, Mecklenburgh-street, W.C.; Fellyory Wharton Ford, 49, Fellows-road, South Hampstead, N.W.; James Harold France, Old Trafford, Manchester; Alexander McInnes Gardner, Partick, Glasgow; John Gardner, Ashton-on-Ribble, Preston, Lancashire; John Frank Johnson Goodacre, Southfields, Leicester; Henry Percy Gordon, "Inglewood," 21, Highbury-quadrant, N.; George Bruce Gosling, B.A., Oxon.; 34, Lennox-gardens, S.W.; Harry Besuchamp Guest, Handsworth, Birmingham; Edwin Lawrence Hall, Woking, Surrey; Kenneth John Sidney Harris, Great Yarmouth; Frederick Harrison, West Hartlepool; Percival William Hawkins, Bromley, Kent; Leonard Dewsnap Hemmell, Broomhill, Sheffield; William Stanley Herr, Bristol; William Hignbottom, Chesham, Manchester; George William Holmes, Norwich; John Bradley Holmes, 79, Warrington-crescent, Maida Vale, W.; Philip Thomas Hopwood, 25, Weighton-road, South Penge Park, Anerley, S.E.; Alexander Mitchell Husbards, 209, Oxford-street, W.; George Hutton, Tiverton, Devon; Alan Trevorton Jones, Tregleath, Newport, Mon.; George James Kendal, Humberstone, near Leicester; Percy Crosbie Kidner, Tiverton, Devon; Frank Moore Kirby, Greenhithe, Kent; Edwin Cecil Lawrence, Leicester; Henry Charles Lea, 6, Swinton-street, Gray's-inn-road, W.C.; Lewis Lewis, Maidene, Newport, Mon.; Edward Maples Linton, Chester; Arthur Herbert Loeck, 26, Courtfield-gardens, S.W.; Alexander George Robertson Mackenzie, Aberdeen; Charles Digby Marriott, Knaphill, Woking; James Mather, Glasgow; Horace Moger, Bath; Harold Henry Mottram, Reddish, near Manchester; Stuart Mill Mould, Gosforth, Newcastle-upon-Tyne; Thomas Henry Murray, Consett, co. Durham; Robert Valentine Notley, Anlaby Lodge, Upper Clapton, N.E.; Felix Oliveri (Gibraltar), 54, Gloucester-crescent, Regent's Park,

N.W.; Reginald Wynn Owen, Menai Bridge, Anglesey; John Henry Arthur Phillips, Kew Gardens; Charles Henry Biddulph Pinchard, Mannamead, Plymouth; John Henry Lowe Pratt, Cheadle Hulme, Stockport, near Manchester; Francis Evan Price, Clifton, Bristol; Louis Edward Pryke, Brighton; John Edgar John Pullar, 96, Tulse Hill, S.W.; Norman Phelps Richards, Putney, S.W.; Albert Bryan Ricketts, Clifton, Bristol; Charles Riddey, Wellingborough; Cyril Alfred Riddsdale, Kew Gardens; Arthur Leonard Roberts, Syston, Leicestershire; Edward Henry Rouse, 43, Hawkley-road, Stoke Newington, N.; Edward Rowlandson, 174, Haverstock Hill, Hampstead, N.W.; Alan Wilfrid Ruddle, Peterborough; Robert Edward Scatchard, Boston Spa, Yorks.; Horace Albert Smale, 21, Rumsey-road, Brixton, S.W.; Reginald Henry Spalding, 8, Ellerdale-road, Hampstead, N.W.; Samuel Cooper Stephens, Aston, Birmingham; Edwin Stanley Surdee, 19, Highbury-place, Highbury, N.; Albert Sweeney, Morningside, Bradford; Andrew Kerr Tasker, Preston, North Shillbury; Sydney Joseph Tatchell, 15, Abbey-gardens, St. John's Wood, N.W.; Edwin J. Tench, Norwich; William Hubert Archibald Terrill, Swansea; Ernest George Theakston, Winton Villa, 4, Hilldrop-road, Camden-road, N.; Christopher Boswood Thomas, Swansea, S. Wales; Charles Clayton Thompson, Holyoke Vicarage, near Ipswich; Philip John Turner, Ipswich; Arthur Halcrow Verstage, Godalming; James Frederick Walker, Banbury; Frank Ward, Bradford; Percy John Warman, 1, Alwyne-road, N.; Horace Paul Willoughby, 21, Parliament-street, Westminster, S.W.; Lionel Braitwaite Winder, Branhall, near Stockport, Cheshire; Edward Charles Wood, Maidstone; Frederick Charles Young, Maidenhead.

These gentlemen had been registered as Probationers.

The President further announced that the Ashpitel Prize had been awarded by the Council to Mr. W. E. V. Crompton, of Wigton, Probationer in 1891, and Student in 1892.

Professor Banister Fletcher then read a paper on "The London Building Act, 1894."

Professor Fletcher's paper was a short one, intended mainly to introduce the subject, and he proposed to deal only with those parts of the Act which were of general interest. Referring to definitions, and to the absence of any definition of a "building" in the Act, he asked: Was it fair of the legal profession to shirk definitions, and thus leave laymen to fight over the "expressions" in Courts of law? The statement that the Act was to secure the sound construction of buildings ignored the past Acts. It would have been more truthful to have put the word "further" or the words "more completely" before "secure." He deprecated the power the Council had taken to vary the rules. He would advise the Council to get rid of this power as much as possible by registering all variations that were demanded and granted, and then from this information formulating fixed rules and regulations which should apply to all. Section 9, Sub-section 4, would prevent the formation in the future of circular or crescent roadways communicating at each end with the same street. There had been much litigation on this question. With regard to projections, the limitation of the projection to 2 ft. 6 in. would seriously interfere with the cornices in Classic and Renaissance architecture. The restriction had now become law, and the only way that a greater projection could be obtained was by setting back the front walls, or obtaining the consent of the County Council. The area permitted as to the cubic contents of warehouses was extended from 216,000 to 250,000. With regard to roofs, more latitude was given in the use of combustible materials by the relaxation of the provisions in the expiring Act. Under the new Act cornices and barge boards of wood were permitted. Other points in regard to roofs were touched upon. The Act recognised for the first time a separation of buildings by other means than party walls. It permitted the separation by a party structure, which might be a party wall, or a partition, floor, or other structure, separating vertically or horizontally buildings, &c. The provisions with regard to separate sets of chambers were made more stringent by making the area commence at 2,500 square feet instead of 3,600; but the stringency of the Act was lessened with regard to their being considered separate buildings. The provisions as to chimneys and flues were practically the same as in the expiring Act, but there was a concession as to chimneys built on a bresummer: the same rule as to building a wall thereon applied. The back of chimney openings could now be 4½ in. in walls other than party-walls. The new Act required the top six courses of the stack or shaft to be built in cement. This was a most useful requirement in maintaining the

stability of the chimney shaft. The new Act relieved the Council of the labour of fixing the thickness and tapering of tall chimney shafts. These were set forth in the Act. The height of the chimney shaft was limited by the width or circumference of the base. The provision with regard to "hollow walls" was likely to prevent their being built, because the wall on one side of the hollow space must be of the full thickness prescribed by the Act for ordinary walls. An important alteration was that under the new Act there was apparently no limitation as to the quantity of openings and recesses on the ground-floor story. This was a most important concession, and removed a great difficulty as to shop premises. This Act set out the structural method of arching recesses which were deeper than 5 in. The arching was to be by not less than two rings in brickwork the full depth of the recess in party-walls, and thus defined the method more clearly than the expiring Act, which only said "arched over." A relaxation of the present rule as to sheds he considered of much advantage to small traders. The Act gave increased height to dwelling-rooms. Instead of 7 ft. the height must now be 8 ft. 6 in. As to the height of rooms in roofs, 1 ft. was added, making it 8 ft. instead of 7 ft. He thought it wise that the regulations as regards the lighting and ventilation of underground rooms were to be continued. The novel provisions as to the sizes of windows to rooms probably were not wanted; it was so usual to build these rooms with sufficient window space. Of course it would enable the District Surveyor to prevent the building of rooms with insufficient lighting—a power he did not now possess. The next very important alteration was the yard space, and a novel feature was the introduction of the diagonal line, limiting the height of buildings according to the depth of the back yard. The objection to the angle proposed, or to any angle, was that it must of necessity make a building worse internally; it was impossible to get square rooms while building up to a diagonal line; any angle should therefore cease when it touched the back wall. Section 45 said that where there were courts within a building, the ventilation should be made and maintained by means of a communication between the lower end of the court and the outer air. It was, he believed, the intention to have required that a tunnel should be made, which would be very objectionable. Probably it would be desirable to consider to-night what this communication should be. Section 13, by making a difference between houses inhabited by the working-class—there was no definition explaining this term—and others, might result in much injustice.

Professor Roger Smith, in opening the discussion, said it would perhaps be more useful to say one or two words with regard to the general character of the Act than to attempt to enter into mere details. He thought the members would find that the general character of the Act was that there was not a large amount of radical change, but a very large amount of alteration in minutiae and in adjustment. A very great deal more detail in a great many cases was provided for, a great many more possibilities were foreseen, and he was disposed to think that, though in some cases no doubt it would be troublesome, in a very large number of cases difficulties would be found to have been cleared away. There were some points in connexion with which almost every gentleman engaged in building in London had found himself in a difficulty. He would only mention two of them, as showing the way in which a good many of these difficulties had been cleared away. One was the question of openings in the front wall of a house or building. Where the shop wall had been very large, and the building above it or below it had not been great, the difficulty had often been extreme of getting a proper balance between the total openings and the total of the brickwork; and where a District Surveyor had felt that his conscience required him to enforce the letter of the law, such expedients as had been alluded to of piling up a useless parapet for the sake of having a more or less opaque wall had been resorted to constantly. In other cases, where a man had felt that he might shut his eyes to an infringement of the letter of the law, this provision had been more or less disregarded. Now by establishing that balance only above the ground story the County Council had relieved the District Surveyors of a considerable amount of anxiety, and considering how large an amount of space could now with perfect safety be allotted to that,



as they had steel girders and iron construction of all kinds, this was a most admirable change. The other point, which was exactly in the same kind of position, was recognising that walls might stand upon iron girders. They had stood upon iron girders for many years past, and especially in the City of London it had been impossible to do anything else. For example, the difficulty of light and air where the buildings had to be shaved off so that each story was set back behind the other there had been no help for it. It was very doubtful whether that had been legal, but it had been done. Now it was made legal, and it was one of the things which could be done with perfect safety. Professor Banister Fletcher had not alluded to all the points which showed a desire to relax some of the difficulties in the way of picturesque building. The Act contained a provision that under certain restrictions oriel windows and projecting turrets might be carried out springing from corbels at a considerable height. These things had from time to time been done, but only by special permission of the Board of Works or of the County Council, and that it should be recognised that those were very reasonable features which might now be introduced at the discretion of the architect was, he thought, a boon. Some of the restrictions with regard to the use of wood were in the same way removed, and barge-boards were now included among the excepted things which might be of timber, although they were outside the house. Again, in the case of detached and semi-detached buildings, the old restriction that a building which had to enjoy light and might have a wooden cornice, but must be a certain distance away from adjoining land and thoroughfares, was done away with. There was another relaxation, which he confessed he was sorry to see, but he had no doubt it would give a great deal of pleasure to a certain number of his friends, and that was that sash-frames and door-frames might now be flush with the outer face of the brickwork. He imagined that, practically, reveals would be revealed for the next twenty or thirty years, but in those cases where architectural propriety made it pleasanter that the sash-frame should come to the outer face more in accordance with the picturesque style in vogue it would now strain nobody's conscience to allow it to be so. He did not think Professor Banister Fletcher had said anything about the tribunal. He had said something about the appeals to the Council, and he (the speaker) was very glad to hear it suggested that the treatment of those appeals should be recorded systematically, so that by degrees they might, perhaps, to a certain extent answer themselves. Formerly, under the old Act, the principal dimensions of factory chimneys had to be sanctioned by the Board of Works or by the Council, and for a long time drawings were submitted, which were approved or not approved. By-and-by, a series of principles was established, in accordance with which these drawings were judged, and now those principles had formed themselves into a code of rules, and if the same course could be taken with regard to the many points where an option was left which the County Council had from time to time to exercise, it would be of great advantage, and probably the same would be systematically done by the tribunal. In conclusion, he bore testimony to the great courtesy with which everyone who came into contact with the Building Act Committee was treated, and to the great attention paid to any suggestions made.

Mr. H. H. Collins said he had listened with a great deal of pleasure to Professor Banister Fletcher's elucidation of the Act. He (Mr. Collins) had heard it said, and he had no doubt it was true, that District Surveyors were those who best knew how to avoid the Act. In past times they had done so, but he thought now they had been well met by the County Council. He had in his possession a list of the various amendments, alterations, and additions which had been made to the Act. Many of these had been put in almost in the words in which the District Surveyors' Association suggested; and he thought that not only as architects, but also as District Surveyors, they would do their best to loyally carry out the provisions which the Act laid down. He agreed with Professor Banister Fletcher that it was somewhat regrettable that the angle was adopted, because he thought it would be productive of bad building. Instead of having brick walls resting upon proper foundations, he believed they would have a variety of attempts at jerry-building, and that these walls would be constructed of mortar, slates, tiles, &c., instead of good, honest brickwork. He observed that Dr. Longstaff was present, and perhaps he would give some authori-

tative reply to a great many questions which would no doubt be put to him. For instance, he wished to ask what provision had been made with regard to horizontal floors; how were they to unite those in building? Where they had a building of 250,000 cubic ft. they must be of iron, he took it, but where they had a building of 2,500 superficial they could be made of wood; and he wanted to know how it was proposed to unite buildings where they were separated by means of a fire-resisting structure. He saw nothing in the Act to say how that was done, and he thought that would be a difficulty which the District Surveyors would find it hard to overcome. Then there was nothing mentioned with regard to the size of flues; they might be made of any size. Although he had no doubt, as Professor Roger Smith had shown, they would not easily depart from their 9 ft. 4 in., still there was no reason why, under the Act, they should not be made any size which any gentlemen chose to make them. With regard to hollow walls, he thought they might take it that, so far as London was concerned, that part of the Act would be an absolutely dead letter. It was not at all likely on the score of expense that that would be very largely encroached upon in London. Shop-fronts were among the things that the District Surveyors particularly called the attention of the Committee of the County Council to, and they at once and liberally recognised it. As Professor Banister Fletcher pointed out, that was the absurdity of having sometimes, as in his own district, a wall 10 ft. in height sunk absolutely in the ground for no earthly purpose, except to comply with the Act. That would be all done away with, a more sensible system having been devised, and for that he thought they ought to be particularly thankful. He also wished to know the meaning of a habitable room in a basement. Did that mean that a kitchen, a scullery, or a pantry, was a habitable room? There was no definition of what the word "habitable room" meant, and he confessed that he scarcely apprehended what the Act meant in that respect. Then there was no definition of the term "working class." The time had come when it was very difficult for anyone to say what the working class was. He thought that a true definition would be men like ourselves, and it would refer to houses for our own occupation. He had prepared a diagram with reference to interior courts, a clause which he thought the County Council rather prided itself on, and which puzzled him very much. He pointed out what he considered a mistake in Section 45; he thought its meaning was the height of such court from the eaves or top of the parapet. He wished to point out that for the first time the length of the court was called the width of the court. That was the very objection which he understood Dr. Longstaff said they were anxious to avoid. They need only put the window at the end of the court, and then they might make it any width they liked. Where it was open at the end they must not have habitable rooms. With regard to stables, the Act did not seem to take any note of the fact that it very often happened that the level of the mews was considerably below the level of the pavement. They were told that they were to take their horizontal line from the level of the pavement. He wished to know what was the real meaning of the Act as it was expressed. With regard to basements, if a basement were lighted from the area in the front, say of 10 ft., why was it necessary that they must have this area as the Act provided? It said every habitable room, but he did not know what was meant by that. Supposing a building had an area in the front, which was a very usual thing, must they also have an area at the back, which might be used as a wine-cellar?

Mr. John Slater said that as a few years ago he read a paper before the Institute on building legislation, in which he very strongly advocated the codification of the existing Building Acts and the preparation of a new one, perhaps he might be allowed a few words on this occasion. On the whole, he thought the County Council were to be very heartily congratulated upon the manner in which they met the objections which were raised in that room and in other places to the Act as first drawn. The Act as it existed now was a very different thing indeed from what it would have been if the first crude suggestions had been attempted to be carried. It would be utterly impossible for any one to attempt to touch upon the various points of the Act which one had noticed in going through it, but there was one remark which Professor Banister Fletcher had made with which he must most heartily and cordially disagree. He said that the Bill bristled with permissions to avoid every clause

of it, and that he would emphatically advise the Council to get rid of this power as much as possible. It seemed to him (Mr. Slater) that in dealing with an Act which affected a city which had been covered with buildings for many years the permissive clauses were the salvation of the Act. It was utterly impossible to draw any hard and fast line for dealing with buildings in existing streets. If they were dealing with utterly new areas or roads, they might lay down what conditions they liked, but if they attempted to do away with permissive clauses in any Act they would either have to be exceedingly lenient, or they would inflict considerable hardship in many cases. He rejoiced, therefore, to find that in a very large number of cases the County Council had allowed reference to them with regard to matters which, in strictness, would not be allowable, but in individual cases, if, as he presumed, they would be properly represented to the Council, the Council might give permission to avoid or evade certain clauses of the Act. It seemed to him that in this respect the Act was an immense improvement, and he would not have the Council depart from their right to exercise their judgment as to individual cases on any account whatever. With regard to what Professor Banister Fletcher had said as to the laying out of streets, he had not carefully looked at the Clause in question, but he could hardly believe that there was anything in the Act that would prevent such a desirable state of things, if they were laying out an estate, as building a crescent, forming a very desirable open space with houses round it. It could not possibly be imagined that the Council would object to that. It was desirable that there should be open crescents and open spaces of this kind. In animadverting upon the Bill before it became an Act he complained rather that nothing had been done with regard to open spaces, and certainly his pleasure, in getting this new Act, would be considerably diminished if he thought that there was no possibility of doing anything of the sort to which he alluded. With regard to the inclination of roofs of buildings, he thought it would afford the District Surveyors a great many very happy moments, because the fact was that the evasions of the existing Building Act, as far as his judgment and experience went, had been far more numerous with regard to this question of the inclination of roofs than in any other way. He thought it important that the inclination of roofs was to a certain extent limited. Mr. Collins had started an objection with reference to the fact that nothing was said as to communication in horizontal fireproof floors. He (Mr. Slater) imagined it was exceedingly undesirable to have more points of communication than was necessary, and he did not think the Council at all contemplated that there would be a number of openings made in horizontal floors, so that he did not think that question was likely to arise. Nothing was said by Professor Banister Fletcher with reference to the tribunal to decide cases. That, he considered, was a very great advance, but he did not think the constitution of the tribunal was the best that might be arranged. He would far rather have a tribunal consisting of a barrister and an architect, than one consisting of three architects. This was one of the provisions of the Act which preceded the 1855 Building Act, and he could not help thinking that some such regulation as that would have been a very desirable one to have started again. In conclusion, he could only express his gratification at the result of the enormous amount of work done by the County Council and others in connexion with the Act, and he only hoped that the general result would be, that they would have a more sanitary, more artistic, and more beautiful London in the future than they could have had under the old Act.

Dr. Longstaff (Chairman of the Building Act Committee of the London County Council) said his feelings on rising to speak that night were somewhat different to what they were when he last addressed the members of the Institute some months ago. Then one felt that one was in the enemy's country, and in a very small minority, but that night Professor Banister Fletcher had so much blessed the County Council, and, through the County Council, blessed him, that he felt quite in a difficulty as to what to say. Professor Banister Fletcher thought it was a great mistake that the County Council had so many powers to permit things, and he knew that was a view strongly held by Professor Roger Smith, who was kind enough not to allude to his objection to the Act in that respect. This, however, was one of those matters of very great difficulty indeed, where the arguments



were almost equal on each side. He knew it might be alleged that they should settle what the law was to be, and that they should write it down so that everybody might know what the law was. He knew also that it was said that if they had power to grant concessions that power might be used improperly, and that they opened a possible door for corruption and undue influence of various kinds. He hoped, however, that that difficulty might not arise; it had not arisen during the last six years. He quite agreed with what Mr. Slater had said, that in London, more particularly, it was absolutely necessary to have this power of granting concessions. Not only did new buildings differ in their position in relation to one another, not only were all sorts of vested interests and associations to be considered, but they had to consider the immensely different purposes to which buildings were used in London. There were buildings which were dwelling-houses pure and simple, but dwelling-houses differed in size, from the very smallest to the very largest, and they could not be dealt with upon one principle. When they came to public buildings the diversity was still greater. Then there were an immense number of the intermediate class of buildings, shops, and offices, and everyone had from time to time to be considered upon its merits. At the same time he so far agreed with those gentlemen who objected to this matter that he hoped that as a rule the law as it was written would be the law that would be carried out and enforced. He thought that if this power of granting compensation were indulged in too liberally and too freely many difficulties would arise. There would be sure to be more or less injustice, however fairly the Council might endeavour to carry it out, and there would in any case be inevitable delay in getting permissions. The Home Office wrote a very strong memorandum, which was finally laid especially before Lord Cross in the Committee of the Lords, in which very great objection was made to one of the heads in the Act on by-laws, which gave power to the Council to relax any by-law. The Home Secretary said that it was the essence of a by-law that it should say what was to be done, and that it should be equal in its operation on all. He (Dr. Longstaff) told Lord Cross that, speaking with some little experience in the matter, he would not personally undertake to frame any by-laws at all for London if he were not allowed the power of relaxation. He had been told by his friends in the provinces that there, where they had model by-laws under the model system, and where they had not the power of relaxation, the greatest difficulty and injustice arose. There were cases where a municipality did not wish to enforce such a by-law, and they were compelled to do it. He was here reminded of one of the most difficult points of drafting. It was when he had to draft a resolution to be sent to Professor Roger Smith to tell him how he was to deal with a retort-house in Wandsworth, which exceeded the cubical capacity. The Building Act Committee thought it was perhaps one of those cases in which it might be necessary to take proceedings to enforce the law. They could not deliberately say to Professor Smith that he was not to do his duty; they had no power to sanction anything beyond a definite extent. A deputation of gas-makers came to his (Dr. Longstaff's) house and explained the facts to him. The Council's superintendent architect, engineer, and chief fireman all went into the question, and they all reported that the larger a retort-house was the more safe it was with respect to fires. Although all the experts were in favour of the retort-house being large, the Law said it must be of a certain size. He did not think Professor Banister Fletcher was quite fair to him (Dr. Longstaff) in reference to the cornice clause. Mr. Statham showed that the Act as originally drawn prohibited a cornice projecting more than 2 ft. 6 in. from the face of the wall. In consequence entirely of a drawing published in the *Builder* they altered those words so as to read "shall not extend more than 2 ft. 6 in.," and then striking out "beyond the face of the wall," and adding "over the public way." That made an enormous difference, because by setting back the building a little bit they could get as big a cornice as ever they liked.\* He

\* The answer to this may be given in the following passage from Mr. Statham's speech: "The changes in London Building Law, pages 83, 84:—'It might be necessary to restrict the cornice' 'to that projection for the paltry narrow street, contemplated in the Act; but for anything like a grand building, a cornice of that restriction is absurd. . . . If it be argued that the building may be set back from the street to allow of a greater projection of cornice, I reply that there is nothing grander, in

thought the members would see that there were questions of danger in this matter, and moreover these cornices would considerably detract from the light of the houses opposite; therefore it was a very fair thing to restrict them. The angle of 75 deg. for roofs had its origin exactly as Mr. Slater said. There was a case in which strong pressure was brought on the Committee to allow a mews of only 20 ft. in width—and they generally insisted on mews being of greater width than that—and at last it was agreed that they might have their mews 20 ft. in width provided the building did not exceed 20 ft. in height. The County Council thought they had got it, but the other parties had them. They set back their wall something like 6 in., and went up two stories higher. They had a 20-ft. mews and a four-storied house; and that, he thought, was a very culpable thing. The question of the diagonal line was too big a matter to go into, and he thought they must agree to differ in that respect. His strong impression, however, was, having seen the operation of the 45 deg. angle in the City of Liverpool, that there would be very few buildings constructed up to the very extreme. They would find that the angle of 63° was such a liberal angle that the mere conditions of convenience and ordinary access of light would make it operate comparatively seldom; the angle that building would be contained in would generally be something between 45 deg. and 60 deg.; probably 50 deg. or 55 deg. would be the common one. As to how a court was to be ventilated, he must refer Professor Banister Fletcher to the Chairman of the Committee of the House of Commons, who put the words in. What he meant by them he (Dr. Longstaff) did not know. Several gentlemen had tried to pick holes in the Bill. There were two great ambiguities which had occurred to him, and he was happy that none of the Members had found out what they were; he would not tell them. It had been complained that there was no definition of the working-class. To begin with, there were a great many Acts of Parliament which dealt with the working-class, but only one had ever defined them, and, as a matter of fact, he believed that no practical difficulty had ever arisen on the subject. If they asked him what the definition was, he would say that there was a very clear definition, and one which, if not absolutely true, would very soon be true—a definition which he thought would make it perfectly clear that Mr. Collins was not included in the working-class—and that was that the working-class were the people who never worked more than eight hours a day. People were divided into the working-class and those who did not work, and that was another definition. As regarded the question of contracts, in Clause 212 there were two distinct points. There was the commencement of the building and the signing of the contract for building. The commencement of a building, of course, meant commencing to build the building, and the interpretation that the Council had put upon that was the carrying-out of any work which it was the duty of the District Surveyor to supervise. If there was anything for the Surveyor to survey then the building had begun. That seemed a pretty safe way of defining it. Therefore the mere digging of a hole could not be the commencing of the building. As regarded the contract, the Council had advised—and if it was not already generally known, it would be known soon—in a circular which had been in print several days, that there was a difference between a building contract and a building agreement, and they did not interpret, so far as they were at present advised, what was known as a building agreement, as a contract within the meaning of the Act. What Professor Roger Smith had said as to how the Factory Chimney Clause came into the Act was quite true, and he had no doubt that when a sufficient space of time had elapsed, they would gradually have got their principle of options into several other clauses. The Professor complained that the Act was not a small one. He was sure he had not so much reason to complain of it as he (Dr. Longstaff) had. It must be remembered that this was not only the Act of 1855, but it was a considerable portion of the Acts of 1869, 1878, and 1882, all rolled into one. It was not quite fair to compare this with the original Act. It was a Consolidation Act consolidating a great many other Acts, and that of

itself was a very great convenience indeed. He was afraid he was not sufficiently a technical expert to quite understand what Mr. Collins meant by a party structure, but if a building were separated horizontally by party structures—amongst other things iron and concrete floors—and if Mr. Collins made an opening through those floors he should say that they would cease to be separated by party structures, and therefore they would not be party structures. He was afraid he did not know anything practically about the size of flues. He thought that gentlemen of their profession ought to have views of their own on this matter. The circular letter to which he had alluded would also help Mr. Collins in his difficulty as to whether a scullery or a pantry was a habitable room; he would find out that they were not habitable rooms. Mr. Collins raised the question of a habitable room in a basement being ventilated from the front. He (Dr. Longstaff) did not think there was so much in this difficulty as at first appeared, because it was quite exceptional for a house with a basement to be so shallow as not to have rooms in the front and at the back, and if these rooms were inhabited he would then find that a habitable room was ruled as inhabited, and he thought he would see that whatever ventilation they might give to the habitable rooms in front of the building, that would not provide for the proper ventilation of the habitable rooms at the rear of the building. But his definition and that of Mr. Collins seemed to disagree, because he seemed to consider that the wine-cellar was a habitable room. He (Dr. Longstaff) was a teetotaler, and perhaps that altered the case. Mr. Collins had shown that the District Surveyor was the gentleman that they should employ if they wanted to get through the Building Act. That, of course, everybody knew before. Although it was quite true that Mr. Collins had made his area very narrow on the diagram, he (Dr. Longstaff) did not think he would build it very narrow. Mr. Collins seemed to think it was an objection to make the area 300 ft. long, but if this area were constructed for the purpose of light and air, surely it would admit much more light and air than if it were 10 ft. long. As to the diagram which showed the difference between the street in the front and the mews at the rear, he thought Mr. Collins knew that that clause was drafted by the joint efforts of Mr. Eustace Balfour and Mr. Caröe, Fellows of the Institute. He (Dr. Longstaff) believed these gentlemen understood that clause, and Mr. Collins had better ask them for an explanation of it. As regarded the question of crescents, he thought there again there was a slight confusion. The Act did not read "every street shall communicate at both ends." It said "no street shall be made until it has been sanctioned by the Council," and the Council might object to that street upon certain grounds, one of those grounds being that it did not communicate at each end, and therefore they had perfect power left to themselves without relaxing any rule at all.

Mr. C. Stanley Peach thought the discussion had taught the members at least one thing, and that was that there were certain points of difference which might arise in connexion with the Act. He hoped that a record of some kind should be kept, from the commencement of the Act, of the various cases that arose—something that members could refer to easily. As to the question of the centre of the roads, he had a case which might come on under the new Act in which that question was involved. It had reference to a street which was formed after July 22, 1878, and before August 22, 1890. Its centre, so far as he knew, had never been defined. Perhaps Dr. Longstaff could enlighten them on the matter?

Dr. Longstaff said he was afraid he could not answer this question, because the words about July, 1878, were introduced by some of their opponents, and they were assented to—he thought very unwisely—by them. The whole clause had therefore become ambiguous. He saw no reason why they should have been inserted, but they seemed to have been thought necessary because they were in the previous Act.

Mr. C. Fowler, in proposing a vote of thanks to Professor Banister Fletcher, expressed the opinion that the Bill as originally drafted was quite impracticable. It was still an Act which he thought would tax the efforts and abilities of those who had to carry it out very considerably, but it was certainly very much better than it was originally. If he had been asked to define the difference between this Act and the old Act, he would have said that the latter was an Act drafted by practical men, and that the former was an Act drafted by very able men who had many good ideas, but not structural ideas. He

a street wide enough to bear it, than the appearance of a great building, or series of buildings, rising straight off the street, with no peculiarities of railings and areas intervening. The new Building Act, as it stands, renders this effect impossible in our capital; it reduces us to lanes for streets, and 'string-courses' for cornices."



referred to the increased cost which would result by adopting a good many of the provisions of the Act, and stated that the additional height given to rooms appeared to him objectionable on that ground. He thought most practical men would say that 8 ft. was an abundant height for any ordinary rooms.

Mr. Thomas Blashill seconded the motion, and said it was not his business to defend the Act, and he did not know that it was his business to explain it. It was his business to assist in the administration of it. There were two or three things which had not been alluded to. An attempt was made in previous Acts to give the definition of a building, but nobody ever succeeded in doing it. They tried to give a definition in the new Act, but it was struck out. As to the power of the Council in certain cases to increase the cubic contents of warehouse buildings upon the recommendation of the superintending architect and the chief officer of the Fire Brigade, it was no use bringing to the Council cases where they wanted to stuff a building with inflammable materials and where they found it convenient to have it as large as they liked. That was not the intention of the Act. It was only in an exceedingly rare class of cases where they could not carry on their business in a smaller building that there was the least chance of the superintending architect and the chief officer yielding to any kind of argument. No speaker, however much he might have abused the idea of the diagonal line, had ventured to suggest anything else. What Professor Banister Fletcher had shown in his diagram was not a new notion. He supposed they had all built houses with backs like that, and when they found it convenient they would do it again. As to the constitution of the tribunal, he was really the person who suggested the nomination to be made by the Institute and by the Institution of Surveyors. He was strongly impressed by the fact that it was not an accomplished architect, but a man with a thorough knowledge of surveying, who was able to deal with those matters which would come before the tribunal. Everything that that tribunal did would be registered.

The vote of thanks was heartily accorded.

Professor Banister Fletcher, in reply, said that the discussion which had taken place had certainly justified his feeble remarks. They had been dealing very much with the diagonal, but he could assure the County Council that they would not only act on the square, but do their utmost to make the Act a workable Act.

The President announced that a business-meeting would be held on January 7, for the award of studentships and prizes, and that the prize-drawings would be on view from the 4th to 14th January next.

#### IRON-WORK, BOURGES CATHEDRAL.

THIS is a portion of the front of the choir-screen at Bourges, apparently a comparatively modern production in thirteenth-century style, designed to harmonise with the architectural surroundings. It is from a full-sized drawing by Mr. Harry Budden, who obtained recently the Sydney Architectural Association Travelling Studentship.

#### ARCHITECTURAL SOCIETIES.

##### EDINBURGH ARCHITECTURAL ASSOCIATION.

—At a meeting of this Association, held on the 12th inst., in the Royal Institution, Edinburgh, Mr. W. W. Robertson, President, in the chair, Mr. S. Henbest Capper read a paper on "The Monks and their Abbeys in Olden Days." At the outset, Mr. Capper spoke of the difference between the monastic life of the East, with its rigid asceticism, and that of the West, where the monks lived together for a common end. When the Benedictines fell away from the strict observance of their early rule, it was pointed out by Mr. Capper how a reformation towards more primitive austerity was begun at Cîteaux by Robert of Champagne, and was continued and spread by St. Bernard of Clairvaux, who was characterised by the lecturer as the greatest figure in the twelfth century. The Cistercian Order, to which St. Bernard belonged, also became popular all over Europe, and was especially so in this country, possibly, the lecturer suggested, on account of the more prosaic character of its ritual as compared with that of the Benedictines. By the aid of the limelight a large number of typical examples of Benedictine and Cistercian abbeys and churches were thrown upon the screen, and their points of difference explained. In the Cistercian monastery the lay

#### Wrought Iron Screen to Choir.

Bourges Cathedral.

Measured 1893. Drawn 1894.

By Harry Budden.

Sydney Studentship

1894.



24 plate 11 & 12.



brother played an important part, and how his appearance there modified the architectural conditions of the abbey buildings was also illustrated and explained. Views were likewise shown of cloisters, kitchens, refectories, &c., and of the internal furnishings of the churches and cloistral buildings. On the motion of Mr. Hippolyte Blanc, a vote of thanks was cordially given to the lecturer.

ARCHITECTURAL SECTION OF THE GLASGOW PHILOSOPHICAL SOCIETY. — At the monthly meeting of the architectural section of the Philo-

sophical Society of Glasgow, held in the rooms, 207, Beth-street, on the 17th inst., Mr. T. L. Watson the President, in the chair, Mr. Alex. N. Paterson read a paper on "Some Principles of Decoration." At the outset he dealt generally with decorative art, so far as related to the decoration of buildings by marble, mosaic, painting, and sculpture in wood and stone, pointing out in connexion with these the use of form and colour, and the judicious blending of the latter. He illustrated his argument by reference to historical examples of the various branches of decorative



art, and stated that a comparison of past and modern methods brought out the poverty of the latter. This was influenced by the fact that the art instincts of the people had for generations been misled by the insistence of the pictorial as opposed to the decorative side of art, and the result of that misdirection was that our picture galleries were crowded to the cornice, while the pictures themselves reiterated with a hundredfold force that art meant pictures. By the formation of Art and Craft Societies, and the further instruction in decoration in Schools of Art, much had been done to rectify this state of affairs. Glasgow, he said, had reason to be proud of its group of painters and artists, who, by their talents, were making for themselves and for the city a worthier name throughout the world. In the wider art of decoration they were still far behind. A scheme was now taking shape in Glasgow, under the supervision of Mr. Leiper, for the decoration of the banquet hall of the Municipal Buildings. There could be little doubt that the Corporation and the architect in charge would carry out this scheme in the largest spirit, and so give local artists an opportunity of executing a work of permanent interest on a large scale. This opportunity they were thoroughly able to take advantage of, if only they were loyal and acted in concert and under the direction of the decorator-in-chief, setting themselves to learn the traditions and canons of mural painting, and the essential difference between it and pictorial art. At the close a vote of thanks was awarded to Mr. Paterson for his paper.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—A meeting of the Glasgow Architectural Association was held in the Rooms, 114, West Campbell-street, on the 17th inst., the President, Mr. A. N. Paterson, in the chair, when Mr. T. L. Watson, F.R.I.B.A., delivered the fourth lecture of the winter series—The subject being "The Thirteenth and Fourteenth Centuries in Italy." The lecturer pointed out some of the varieties of Gothic architecture that prevailed in the different divisions of the country. The influence of the classical art of antiquity was felt throughout the whole Gothic period, and was seen in the general effect of breadth, in the horizontal treatment, and the flat surfaces, as opposed to the vertical treatment and the deeply-recessed openings and mouldings of northern Gothic. It was seen in the indiscriminate mingling of round and pointed arches; in the fondness for the single round pillar or shaft in place of the clustered column, and for the tapered form of pillar instead of the cylindrical form almost invariable in the north. There was a certain defect of the constructive sense seen in the prevalence of the iron tie-rod to hold the arches together, and in the overloading of slender pillars apparently quite unequal to their task. The fact that they were still standing, after 500 years, was a proof that they were in reality strong enough, and something must be allowed for the known hardness and strength of marble as compared with the building-stones employed in the north. After every allowance was made, however, it had to be admitted that the apparent weakness of many of their buildings was a characteristic and serious defect. A third characteristic was the great wealth of colour produced by various marbles, brick, and terra-cotta, and by mosaics and fresco paintings. Many of the painters were architects also, and even those who were not showed an intimate knowledge of architecture. The paintings were really allied to the buildings, and not merely applied. The architecture painted as accessory to the figures was in harmony with the lines of the building, and the figure subjects also had the architectural qualities of symmetry, restraint, and repose. The architecture, painting, and sculpture of the Renaissance were then touched upon, and the same qualities were illustrated up to the middle of the sixteenth century, after which there was rapid deterioration. In the course of the lecture line-light views were shown and briefly described by the lecturer, including a series of early mosaics from Ravenna, sculpture by the Pisanos, the Della Robbias, Ghiberti, Donatello, Della Quercia, Benedetto da Majano, and Michelangelo, with a large number of buildings and details.

**SANITARY INSPECTORS' ASSOCIATION.**—We are informed that Mr. Edward Tidman, C.E., F.S.I., of 34, Victoria-street, S.W., has been elected Hon. Secretary of the Sanitary Inspectors' Association by a special general meeting of the members, held at St. James's Hall on Saturday last, upon the resignation of Mr. Samuel C. Legg.

## Illustrations.

### "THE NATIVITY"—DESIGN FOR MURAL PAINTING.

**THIS** is a design for part of a painted frieze to come just above the nave arcade of a church, and is mainly to be executed in pale colours, amongst which tones of yellow and red predominate. The angels have white undergarments, their wings being bluish, greenish, reddish, and white. The little angels' wings are a lakey red, and relieve against a pale yellow robe of the angel behind; the other angels' robes are a greenish blue, pinkish salmon, and yellowish salmon. The angels and the Divine Child are surrounded by a yellowish haze. The Virgin is robed in the traditional colours, and St. Joseph in raisin purple and low-toned yellow. The manger runs across the design within the hollow of the cave. The border is a pale bluish and green design upon a yellowish ground much the colour of gold.

The scheme of coloration being mainly composed of oppositions of yellows and reds to pale blues and greens, it is a marvel that the reproduction should be so successful, the only serious defect being in the angels' faces, the modelling of which is exaggerated by the warm tones photographing dark, and the expression lost in consequence. This is, of course, an inherent weakness in the conditions of photography, and cannot be helped.

F. HAMILTON JACKSON.

### SOUTH SHOEBURY CHURCH.

THE building is of Norman character with later additions, the tower having been built in the fourteenth century, probably by a Kentish mason, and the chancel lengthened and south porch added in the fifteenth century. The church was "restored" in the present century, and the late well-known antiquary, Mr. H. W. King, has stated that the windows then contained a quantity of old French glass. This, together with the whole of the ancient fittings, has now entirely disappeared, and the existing fittings and windows are unworthy of the church. The present scheme includes the opening up of the nave roof, a very fine example of the usual Essex type, the structural repair of the nave and tower, the addition of a vestry for clergy and choir, the renewal of the south porch, and the refitting and decoration of the interior. The first section of the work, consisting of the renewal of the porch, has just been completed by Messrs. Trask & Sons, of Norton, Somerset. The fifteenth-century oak porch had been mutilated and re-framed some 150 years back, and the sprockets, barge-boards, and barge had been removed. In the late reconstruction the old timbers have been sorted and replaced in their original positions, the defects being made good with new work; the decayed parts of the old oak have been spliced and made good where absolutely necessary, and the whole porch placed on a solid foundation of brick and cement. It is proposed to follow a similar course in the repair of the nave roof, though here it is hoped that very little new woodwork will be required beyond the boarding. Fortunately the church, with the exception of the tower and nave roof, is now in good structural repair, so that no interference with the old walls will be necessary.

The addition of the vestry is an unfortunate necessity, but it is hoped that by adopting an extremely quiet type of design the effect of the exterior of the church will not be materially altered.

It is proposed to utilise the tower as a baptistery, and to place a part of the choir therein. The organ is to be placed in a bridge or gallery across the tower arch, and played from below. It is also hoped that funds may be forthcoming to refit the church and chancel, and to obliterate the traces of some repairs which were made in the latter some few years ago, when an Early English priest's door was renewed in cement, and the ceiling lined with common varnished match-board.

The perspective view shows the ancient Norman chancel arch with two recesses at the sides, which were contrived in the thirteenth century in order to accommodate altars. The return recess on the south side had originally a counterpart on the north, which was partly destroyed in the fifteenth century to make room for the rood stairs. The old rood beam over the arch still remains, and it is proposed to place a new rood with the usual attendant figures thereon. The rest of the fittings shown in the drawing form part of the scheme of restoration.

CHARLES A. NICHOLSON.

### COLLEGE-STREET, GLOUCESTER.

THE new buildings here illustrated have been lately erected on the east side of the old approach leading from the Westgate-street of the city, past the site of King Edward's Gateway, to the College Green.

Until very recently, this street was only 9 ft. wide in the narrowest part, including the foot-paths, with but little increase of its width throughout its entire length. It was dangerously narrow, and impassable for two vehicles at the same time.

Excepting some small remains on the west side of the street, the whole of the old Gateway has long since disappeared.

The width of the street has now been increased to 36 ft., whereby not only has ample space been provided for all traffic, but a very fine view of part of the south front of the Cathedral and the Tower has been opened out.

The old buildings which have been removed consisted of very inferior shops, worn-out and dilapidated, and of no architectural or archaeological interest whatever; there are, however, remains of fine old wooden houses in the precincts and in the Westgate-street, and these determined the style adopted for the new approach to the Cathedral, as shown on the sketch.

The architect is Mr. F. W. Waller, of Gloucester.

### THREE MONUMENTAL BRASSES.

BRASS OF JOHN ESTNEY, ABBOTT, FROM WESTMINSTER ABBEY.

THE figure, vested in a chasuble richly jewelled, holds in his hand a pastoral crook turned outwards. As a "mitred abbot," he wears a rich decorated mitre; a "vexillum," or little banner hangs from his crook. From his mouth issues a label, upon which is inscribed "Exultabo in Deo Jhu meo." The triple canopy is very ornamental, but the central pinnacle and the one on the left are broken off, about a foot in each case. The stole appears as usual beneath both dalmatic and tunic—unlike the Post-Reformation effigy of Bishop Goodrich, of Ely (*vide the Builder*, October 31, 1891), which has the stole appearing between the two. Formerly this brass was on an altar-tomb in the screen formerly on the south side of the chapel of St. John the Evangelist, which was destroyed in 1772 in order to make room for the monument of General Wolfe. John Estney died in 1474. He was the patron of Caxton, whose printing-press was set up here in 1477.

The brass measures 80 in. by 29½ in., and now lies in the north ambulatory of the Abbey.

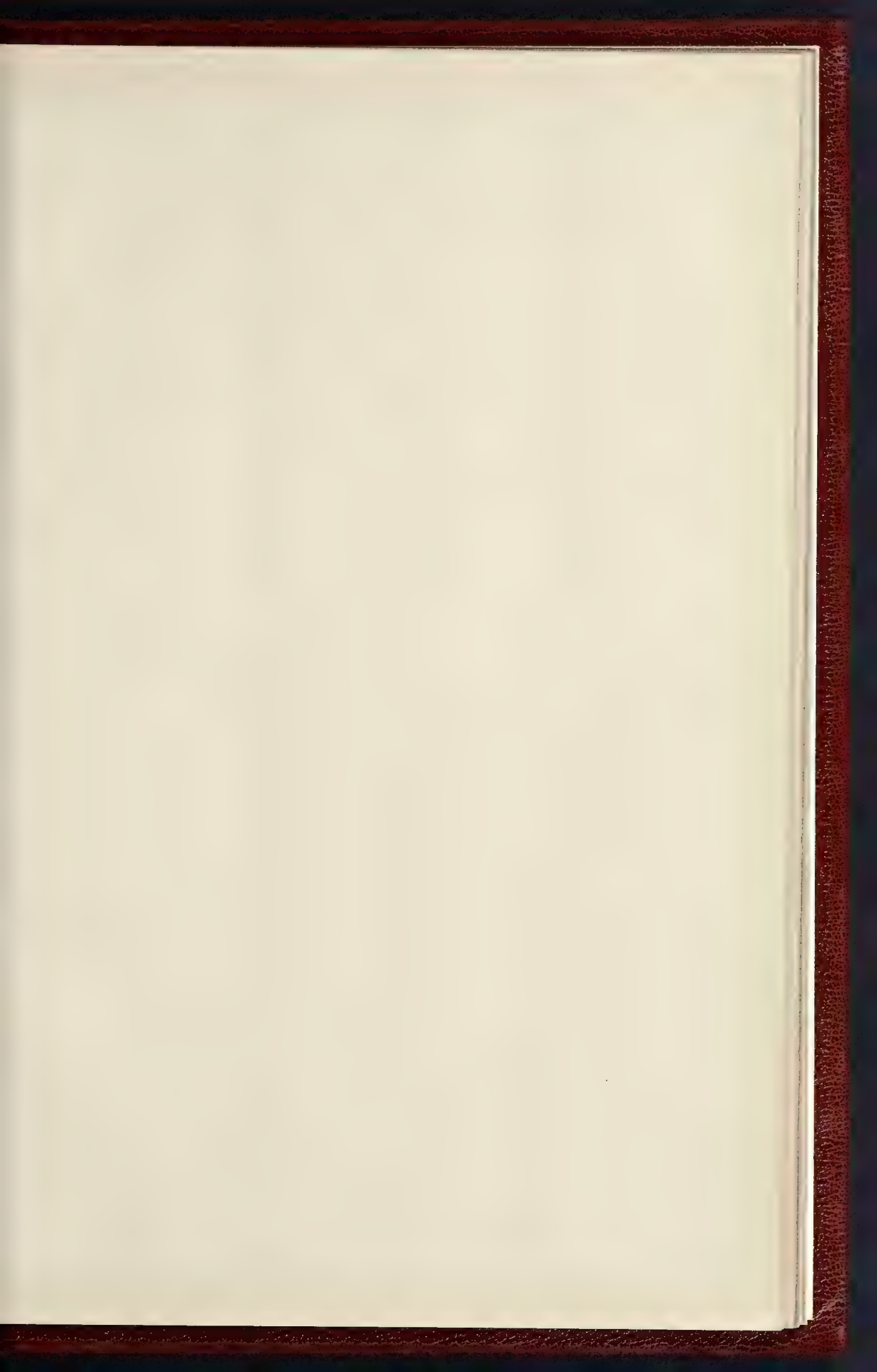
BRASS OF JOICE, LADY TIPTOFT; FROM ENFIELD CHURCH. (A.D. 1440: 25th HENRY VI.)

THIS is a very elaborate and handsome brass, lying on an altar, slightly on the north side, close to the Holy Table, in the Parish Church of Enfield, Middlesex. The effigy is habited in a seamless cote-hardi, worn over a kirtle, and a mantle, the latter being embroidered with coats-of-arms, placed thus:—On the dexter side—Powis; Tiptoft impaling Holland with Tiptoft; Tiptoft. Sinister side—Tiptoft impaling Powis; Powis and Holland quarterly; Powis. Three out of the four evangelistic emblems at the corners are lost. This lady was daughter of Edward Charlton (in the inscription Latinised into *Caroli*). Lord Powis, who married Eleanor, widow of Roger Mortimer, Earl of March, and daughter of Thomas Holland, Earl of Kent. Lady Tiptoft died in the forty-third year of her age. The height of the entire composition is 8 ft. 4 in.

BRASS OF ELEANOR DE BOHUN, DUCHESS OF GLOUCESTER, FROM ST. EDMUND'S CHAPEL, WESTMINSTER ABBEY. (A.D. 1399.)

THIS figure rests on an altar-tomb, under a fine triple canopy which has but one pinnacle mutilated. The arms represented are: dexter side, 1st Old France, and England, quarterly, within a bordure argent for Thomas de Woodstock; 2nd *azure*, a bend argent cotised between six lions rampant, *or*, for Bohun; 3rd gules, two bends, one *or* the other argent for Milo, Earl of Hereford. Sinister side: 1st Woodstock, impaled quarterly 1st and 4th Bohun; 2nd and 3rd Milo, Earl of Hereford; 2nd Bohun impaled quarterly 1st and 4th gules, a lion rampant *or*, for Fitzalan, 2nd and 3rd *chequie or and azure*, for Warren—the 3rd is lost, but bore gules a swan argent, ducally crowned and chained (see centre of the canopy) *or*, for Mandeville, Earl of Essex (?). Eleanor de Bohun's husband was uncle to Richard II., by whose order he was arrested (probably from jealousy of personal appearance), conveyed to Calais and smothered before trial.







BRASS OF JOHN ESTNEY, ABBOT OF WESTMINSTER  
(WESTMINSTER ABBEY)

BRASS OF J  
(ENF)



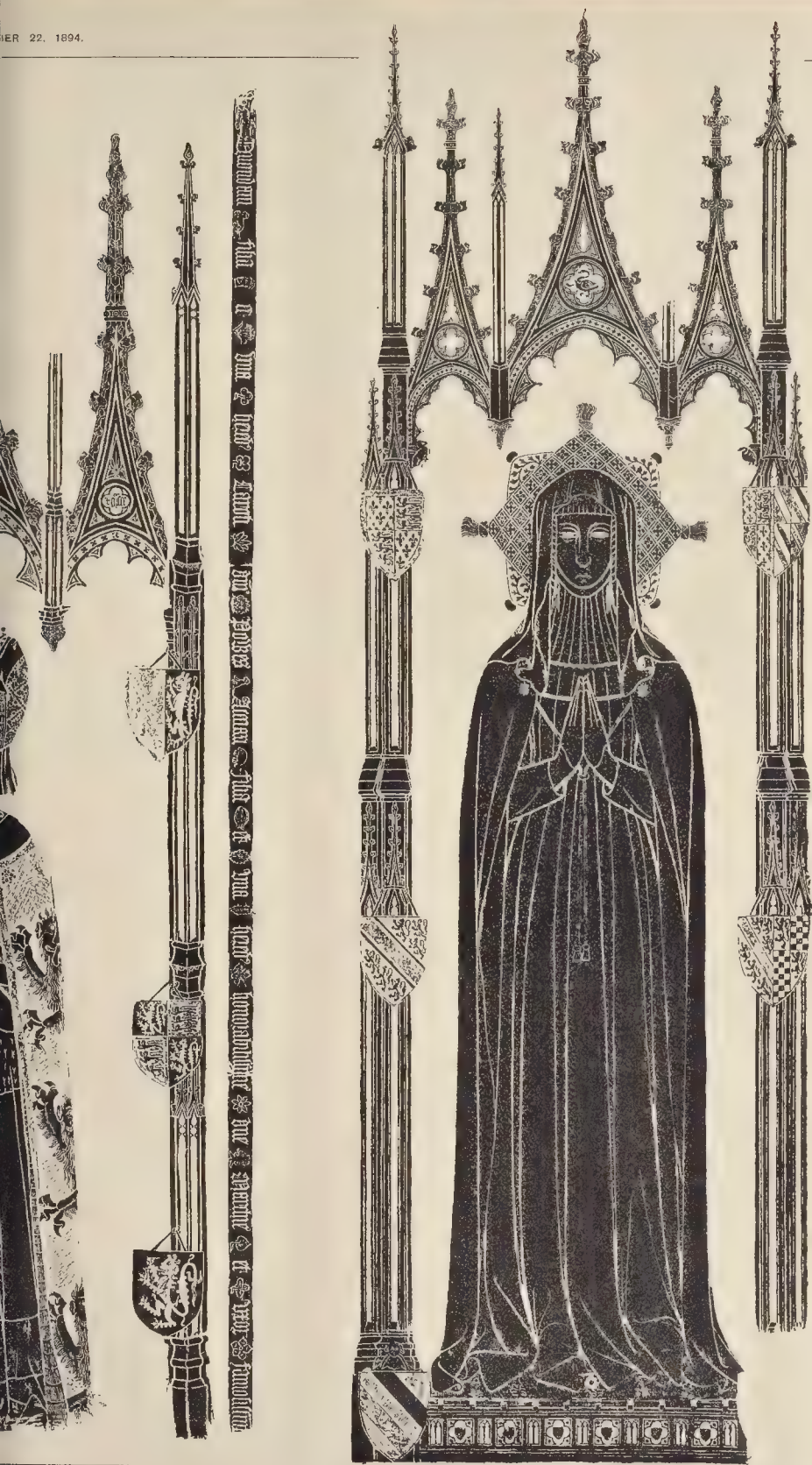
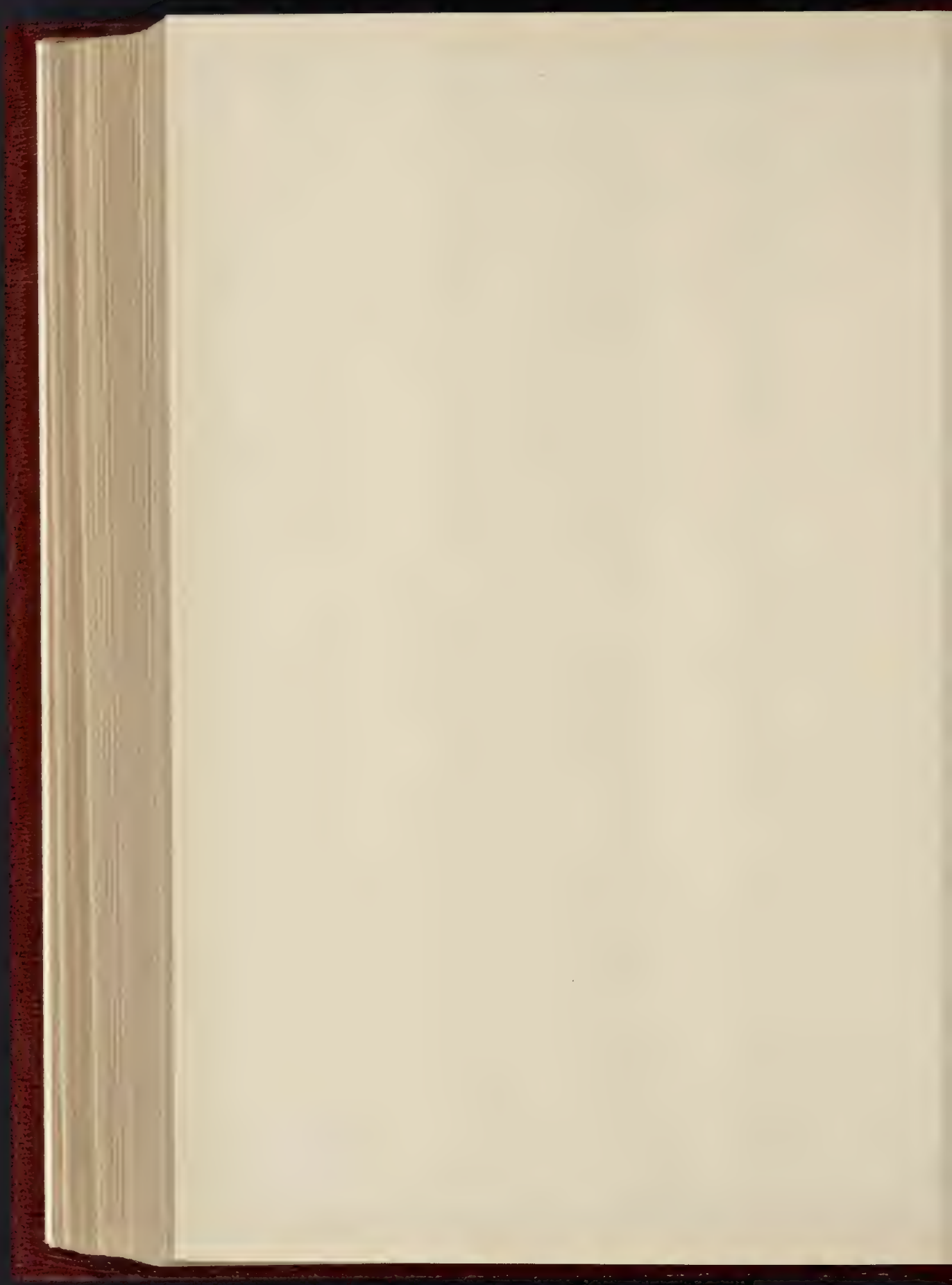


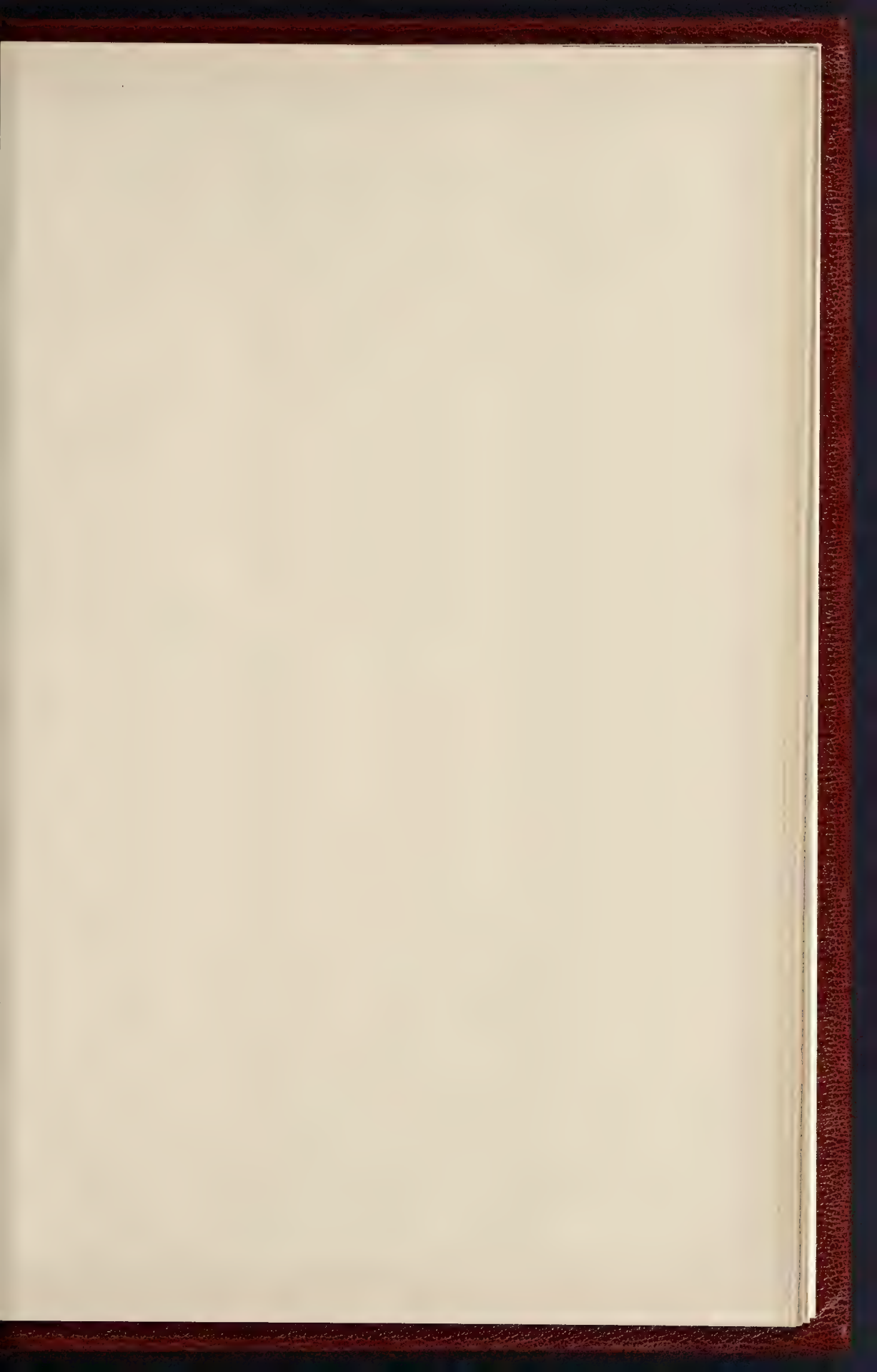
PHOTO. L. THO. SPRAGUE & CO. 46, EAST HARDING STREET, LONDON, E.C. 4.

LADY TIPTON.  
(URCH.)

BRASS OF ELEANOR DE BOHUN, DUCHESS OF GLOUCESTER.  
(WESTMINSTER ABBEY.)







THE BUILDER, DECEMBER 22, 1894





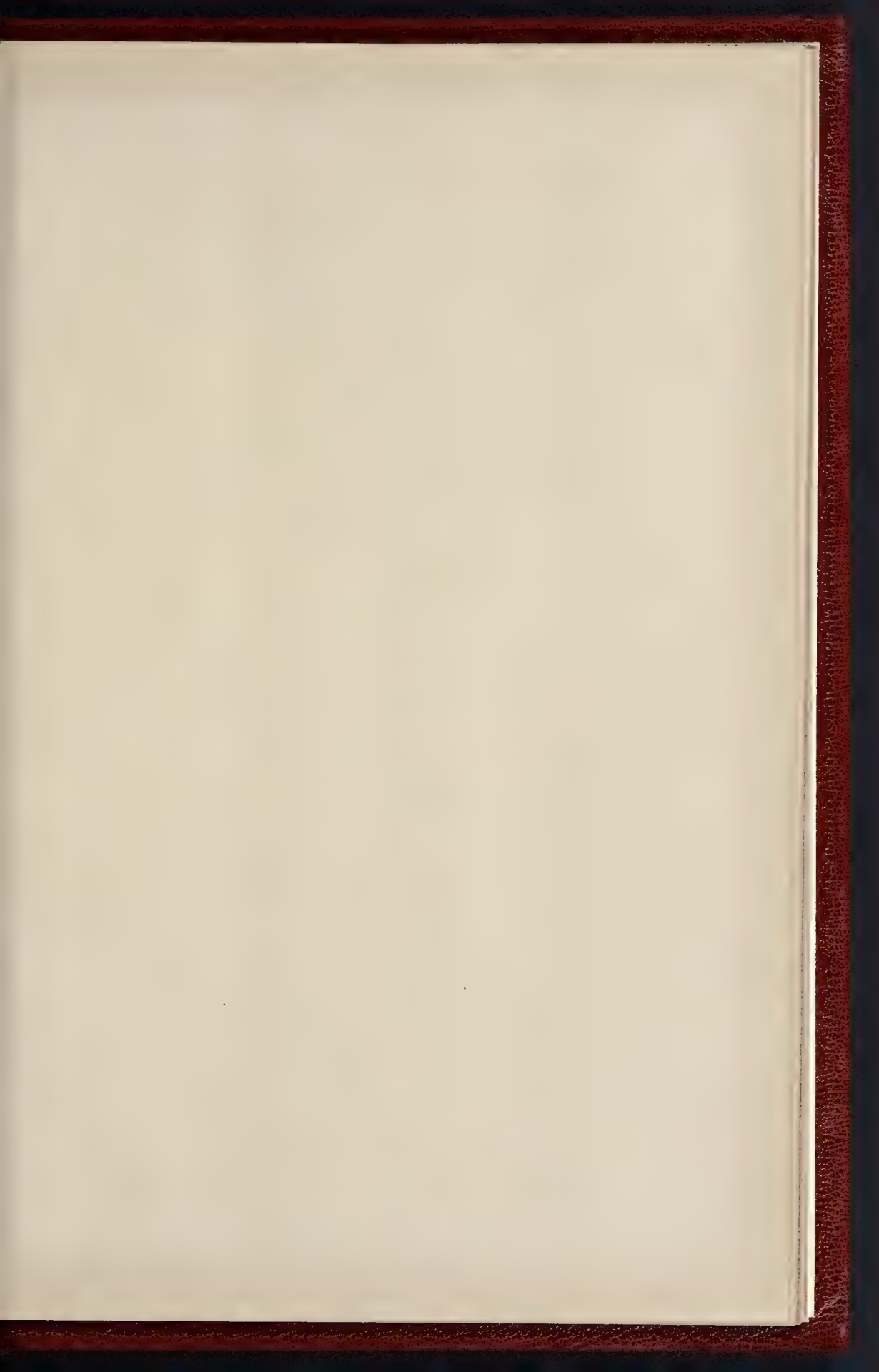


THE NEW COLLEGE STREET, GLOUCESTER. MR. F. W. WALTON, F.R.I.B.A., ARCHITECT.

W. & A. T. 1894









"THE NATIVITY" DESIGN FOR A MUSEUM

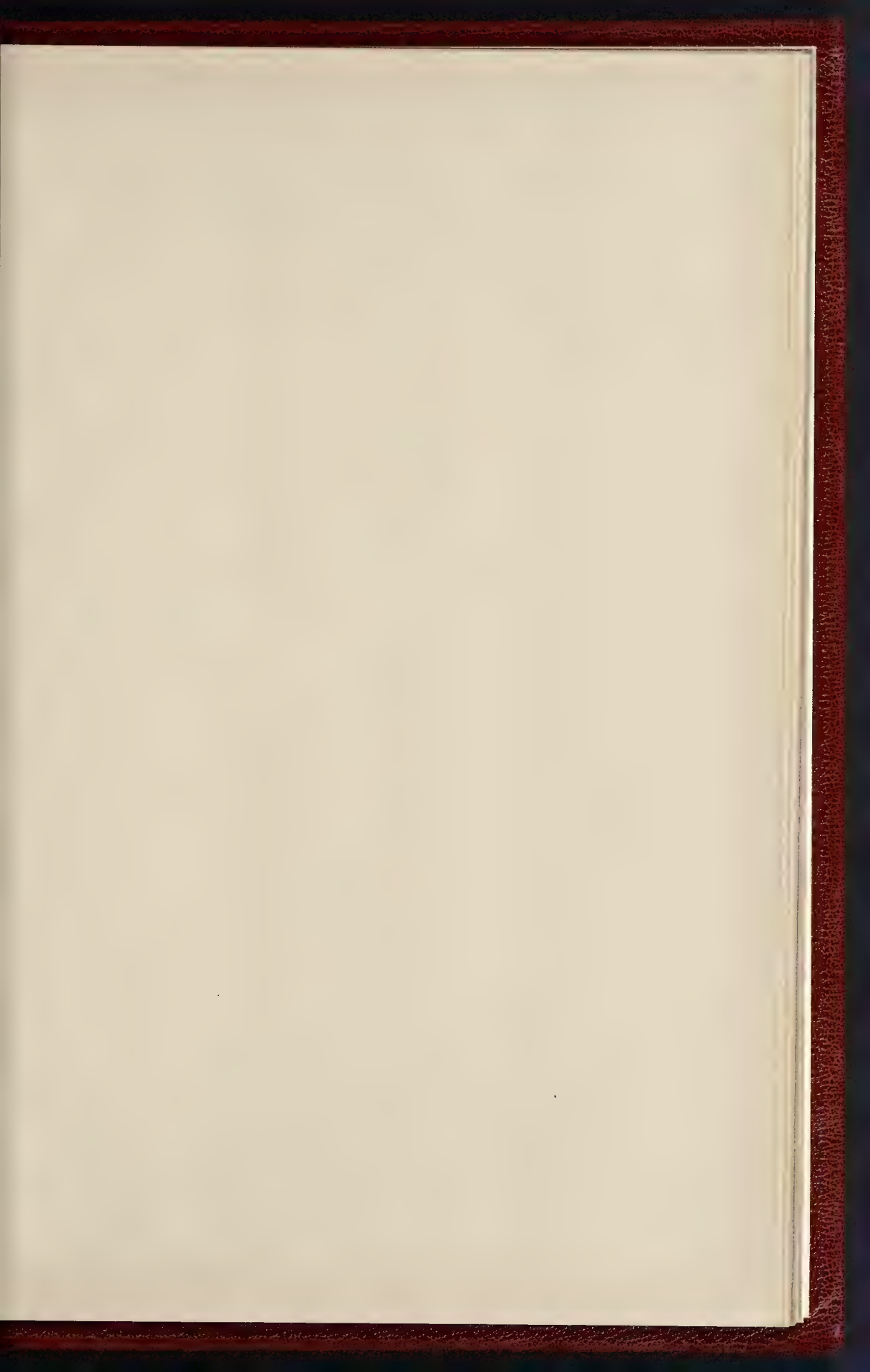


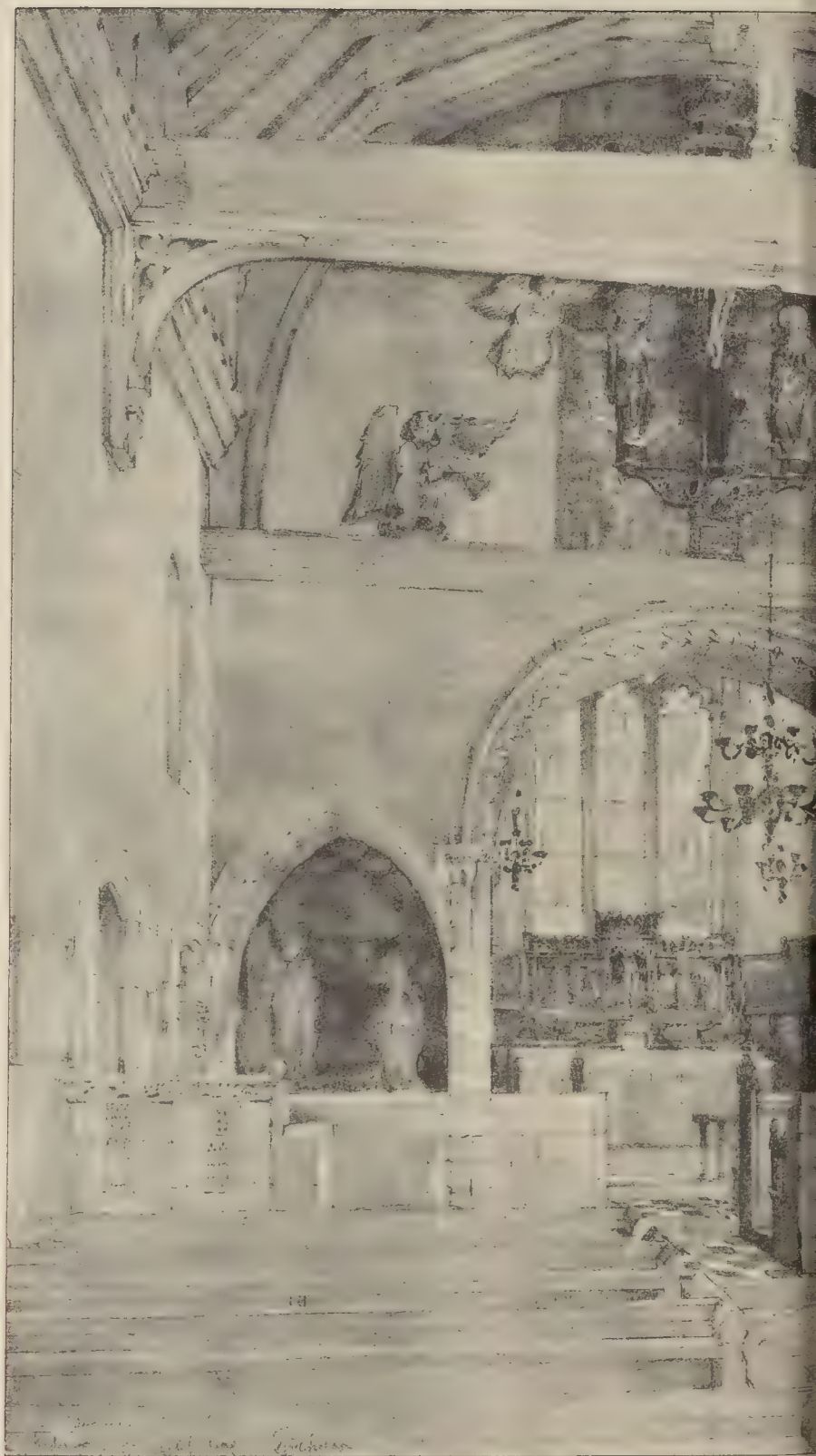


INTING.—By MR. F. HAMILTON JACKSON.











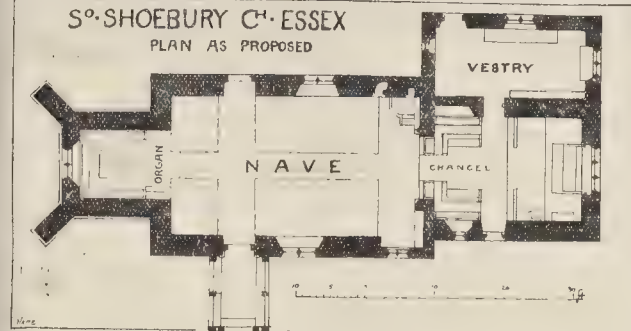






S<sup>o</sup>. SHOE BURY C<sup>y</sup>. ESSEX

PLAN AS PROPOSED



A.D. 1397. His widow retired into a nunnery at Barking, in Essex, hence she is represented in a nun's dress, and died A.D. 1399.

## THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, Sir John Hutton, Chairman, presiding.

**Engineering Students at the Blackwall Tunnel.**—The Council acceded to the request of Sir Alexander Taylor, the Principal of the Royal Indian Engineering College, Cooper's Hill, that two of the students might be allowed on the works of the Blackwall Tunnel, with the object of gaining experience in the construction of tunnels by means of compressed air, especially as the Government of India would probably have a tunnel made under the River Hoogly at Calcutta, and that it was necessary some practical knowledge should be obtained.

**Quinquennial Valuation.**—The Local Government and Taxation Committee reported that, in view of the quinquennial valuation, which takes place next year, they had been authorised to take the necessary steps for a sufficient examination of all the assessments in London at an expenditure not exceeding 2,500*l*. Suitable persons would confer with the overseers of the parishes in the preparation of the lists. That, however, was objected to by Mr. Fardell, who moved that the Report be sent back to the Committee. The amendment was negatived, and the Committee's report agreed to.

**Drainage of Lewisham.**—The following adjourned report of the Main Drainage Committee was brought up, the recommendation being agreed to:—

"Our attention has for some time past been called to the want of adequate main sewer accommodation in the district of Lewisham, and the Board of Works for that district has made numerous representations to us by deputation and otherwise as to the necessity of relieving the existing sewers by either constructing a new sewer or enlarging the Ravensbourne and Sydenham main sewer. This sewer extends from the Deptford Broadway, where it joins the Efrin branch sewer, to Bell Green, and is the only main sewer at present available for conveying away the drainage of Penge, Sydenham, Forest Hill, and Brockley. At Bell Green its size is only 3 ft. 9 in. by 2 ft. 6 in., and it becomes quickly gorged even when a moderate quantity of rain falls. Between Bell Green and the point at which it leaves the Lewisham district, where its size is 6 ft. by 4 ft., there are eleven local brick sewers, varying in size from 3 ft. by 2 ft., to 4 ft. by 2 ft. 8 in., besides a large number of pipe-sewers connected with it. The sewer was constructed by the late Metropolitan Commissioners of Sewers about forty years ago, and very little provision was made for admitting rainfall into it. Moreover, since its formation the land in the neighbourhood of Penge has been built upon, and the drainage passes into the sewer. In the year 1873 the Beckenham Sewerage Act was passed, by which the Beckenham Board were authorised to drain a certain portion of that district into the Metropolitan Main Drainage system, and this drainage finds its way, in the first instance, into the Penge and Bell Green sewer, which subsequently discharges into the Ravensbourne and Sydenham main sewer. Under these circumstances we are satisfied that the Council should afford further relief to the sewers of these districts, the population of which has so much increased in recent years. It was at first suggested by the Lewisham District Board that the existing sewer from Deptford to Bell Green should be enlarged and improved. This, however, cannot

be done, as there would be no possible means of diverting the sewage from the sewer during its reconstruction. It has therefore now been proposed by the engineer that a new sewer should be constructed from Bell Green along Perry Hill through the Ladywell Recreation-ground and Algernon-road to Loampit Vale, making a junction with the Ravensbourne and Sydenham sewer at the latter place, and keeping it low enough to pass well under the river Ravensbourne. The length of the proposed sewer, the cost of which is roughly estimated at 66,000*l*, will be about 15,245 ft., and its size partly 5 ft. 6 in. by 3 ft. 8 in., and partly 4 ft. 9 in. by 3 ft. 2 in. As we were of opinion that if the Council made the proposed new sewer the District Board should also take some measures for the relief of the districts now affected in times of rainfall, we communicated with them on the subject, and they have agreed to construct a sewer between Penge and Bell Green and to complete the same, together with the necessary connexions with the local sewers, by the time that the Council's new sewer is finished. We recommend:—

"That the Council do construct a new sewer from Loampit Vale to Bell Green, and that the Engineer be instructed to prepare the necessary plans, specification, and estimate of the cost of the work."

**Applications under the Metropolis Building and Management Acts.**—The report of the Building Act Committee recommended that the further application of Messrs. Lander & Bedells, on behalf of the President and Governors of the Royal London Ophthalmic Hospital, for the consent of the Council to the erection of a hospital building on the south side of City-road, St. Luke's, at the corner of Gayton-street, and also abutting upon Peerless-street, be granted; and that the application of Messrs. Joseph and Smithem, on behalf of the Four per Cent. Industrial Dwellings Company, Limited, for the consent of the Council to the erection of a block of industrial dwellings between Nos. 77 and 111 (odd numbers only), Stepney-green, Mile-end Old-town, be also granted. This was agreed to.

**The Works Committee and Jobbing Work.**—The following paragraph from the report of the Corporate Property, Charities, and Endowments Committee gave rise to some discussion:—

"In December of last year, during a severe gale, the Council's wall separating certain vacant land in Cheyne Walk from Beaufort Lodge, Beaufort-street, was blown down, and Mr. B. H. Cooper, the owner of the house, asked for compensation for damage caused to some trees, vases, and other things. The matter was referred to the solicitor, who reported that liability should be denied, which was accordingly done. Almost immediately the valuer, acting upon our instructions, requested the Works Department to remedy the damage done, and an account was sent in for 60*l*. 8*s*. 1*d*. Having regard to the nature of the work which was executed, it appeared to us that the charge was excessive, and accordingly we instructed the architect to investigate the account, which he did, and after taking everything into consideration, reported that a sum not less than 37*l*. 12*s*. 1*d*. should be deducted. We have been in communication with the Works Committee upon the subject, and that committee, whilst unable to reduce the account, have expressed the hope that when the schedule prices for jobbing works have been settled, and each work is measured up and priced in accordance with it, there will be no further cause for complaint. We recommend:—

"That subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the Council do authorise the expenditure of 60*l*. 8*s*. 1*d*. for the reparation of the boundary-wall of certain land in Cheyne Walk, Chelsea."

Mr. Antrobus referred to the unsatisfactory manner in which the Council's workmen carried out their operations generally. He maintained that the Council were not getting a proper return

in the shape of labour for the fair wages which they were paying the men. It would startle the Council, he thought, if they only knew the length of time it took some of their workmen to complete the most simple work. He thought that those gentlemen who called themselves the Labour members should take this matter seriously in hand, and take such measures with the workmen as would remove all source of complaint in the future.

Mr. Emden pointed out that if the workmen wished the scheme to be a success, they would give the full value of their labour, otherwise their excuses would not prevail.

Mr. Crooks thought that Mr. Antrobus ought to withdraw his complaint. The Labour members had never backed up workmen who had not done their duty, but they had always impressed upon them the necessity of acting fairly and properly to their employers.

Colonel Rotton said it was a constant complaint throughout London as to the enormous waste of time by the workmen employed by the Works Committee.

Sir John Lubbock, whilst giving credit to the Committee for the care and pains they were taking, thought they had accepted a task of an almost impossible character, and that if it were allowed to continue great loss must result to the ratepayers generally.

After some further discussion the recommendation was agreed to.

**Surveying Sources of Water Supply.**—The Water Committee submitted a report in which they stated that last October the Council authorised them to have surveys made of certain large reservoirs in connexion with a scheme for water supply to London which they had now under consideration, the total cost of such surveys for one year being 450*l*. The reservoirs in question, however, were connected only with one branch of the scheme, and there were others with respect to which similar surveys were necessary. They were advised that, in the interest of the Council's policy as connected with the Bills for the purchase of the water companies' undertakings, ample information should be forthcoming on this subject, as the question of supplementary supply might be regarded as an integral part of the general problem. They had therefore come to the conclusion that the two sets of surveys should proceed together. The expenditure involved would be the same as in the case already sanctioned, and they recommended:—

"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, authority be given to us to have surveys made of certain large reservoirs, in addition to the surveys authorised on October 30, at a total cost not exceeding 450*l*."

This was agreed to.

**The Purchase of Tramways.**—The Highways Committee reported that the arrangements for the transfer to the Council of a section of the London Street Tramways were nearing completion. As the Council was not in a position itself to work the tramways they had prepared a draft of a lease for letting this section to a company. In this they had inserted clauses providing that the undertaking should revert to the Council in 1898, and restricting the hours of labour of the employees of the lessee to sixty per week, or ten hours per day upon an average of two consecutive days. Before the draft lease was prepared the committee had some negotiations for leasing the tramways which confirmed them in their opinion that the lease should be the subject of public competition. They therefore recommended that advertisements be issued for tenders for a lease of the tramway.

The report was adopted.

The Council at its rising adjourned until January 15.

**THE INSTITUTE OF CERTIFICATED SANITARY INSPECTORS.**—At the general meeting of this Institute, held on the 14th inst., at the Parkes Museum, Margaret-street, W., Mr. Matthew Bates, Bromley (Kent) Local Board, read a paper upon "The Investigation of Infectious Diseases, and some Means of Preventing their Spread." Mr. W. H. J. Gathercole (London) also read a paper on the subject of "Drain Openings inside Buildings," and in the course of his remarks expressed the opinion that in all eating-houses the kitchen arrangements should be at the top of the building, the tendency now being to place them in underground cellars, without proper light and ventilation. A discussion amongst the members ensued. Votes of thanks were passed to Mr. Bates, Mr. Gathercole, and to the Chairman, Mr. Wynter-Illyth, the Medical Officer of Health for Marylebone.



## Books.

*Handbook of Ancient Roman Marbles; or, a Description of all ancient Columns and Surface Marbles still existing in Rome, with a list of the Buildings in which they are found.* By the Rev. H. W. PULLEN, M.A. London: John Murray, 1894.

THIS is a wonderful little book. As the author truly says in his introductory remarks, it is not scientific, nor complete, nor classical; at least, it is neither scientific nor classical—we do not understand the precise signification of "complete" in connexion with it. It pretends to be a handbook for the tourist of archaeological tastes, but we fail to see where his wants are catered for. Altogether, it is a most puzzling conglomeration. If we were to describe it in a few words we should say that it is a carefully-compiled list of the marbles still existing in ancient buildings in Rome, with their exact locations, interspersed with some of the most pseudo-scientific twaddle we have ever read. The author distinctly disclaims the possession of such scientific attainments as would have fitted him to deal with the subject from a scientific standpoint; why, then, does he after all attempt to do so? The result, as might readily have been anticipated, is grotesque in the extreme. The Italian names given to each kind of marble have evidently been revised with much attention, in so far as they describe the various materials as recognised by students. The author, however, spoils even this, the best part of his work, by alluding to the marbles as though they were true biological genera and species. What would the learned author of the "Systema Nature," were he still living, think of such nonsense as the following?—"Index.—Showing the true Genera and Species. All other marbles are Varieties, frequently occurring together on the same large slab or column." Having promised, by inference, in the last-quoted paragraph to adopt binomial principles it is a pity our author does not adhere to them. The nomenclature employed may be good Italian, but it is absurd, for all that, when it is made to designate "genera and species." Apart from the fact that the terms used are not Latinised, we are presented with many such incomprehensible names as the following:—"Bigio brecciato minuto rossastro," "Cipollino mandolato verde grande." Which is the generic appellation? which the specific? and which the varietal, of each of these two marbles, according to any recognised rules of nomenclature? The idea that several "Varieties" (used in connexion with "genera and species") of marble can occur on "the same large slab or column" is excellent. Such observations remind one of the writings of early eighteenth-century authors, but perhaps these are the parts intended for the tourists. The whole of the marbles of ancient Rome are arranged by our author in fifteen groups, the very composition of which is quite sufficient to show us how far he understands the subject. Group No. V. comprises "shell marbles containing molluscous animals." We do not know whether any modern student of malacology would care to use the word "molluscous," but we can feel for the unfortunate "animals" imprisoned since "pre-historic" times. The diagnosis of group No. VII strikes one as being extremely lucid, to wit: "Affricano, belonging properly to the last-named group, but presenting well-defined characteristics of its own." Precious stones, jaspers, agates, basalt and arenaceous and calcareous stones, are all included in the groups mentioned. The author tells us to beware of accepting names of marbles from works treating of the subject from "a builder's or house decorator's point of view," or as given by the scarpellini in Rome, as being "wholly unscientific"; yet with reference to the marble known as *Porta Santa*, this caricaturist can bring himself to say that it has "a most remarkable resemblance to cold roast beef"; another kind is "mottled like boiled sage"; a third has "large slugs"; a fourth possesses a "texture of raw beef"; others have "broad striated veins of fleshy white, resembling beef fat," or are "beef-red," or "dark gelatinous with truffles," or like "sugar-candy." It appeared all along that the author was a bit of an epicure, but our suspicions received a striking confirmation in the description of the marble known as *Occhio di Pavone pavonazzo*. This is said to be "peppered," and to have "Oysters transparent, . . . yellowish," whilst there is a "suspicion of violet-brown"—the only ingredient missing is the vinegar. We say nothing about marbles of

marine origin containing "snails"; neither ought we to quote such beautiful phrases as—"The nobler kinds of jasper form a connecting link between marbles and precious stones," or "Granite bears very much the same relation to coloured marble as the grasses bear to coloured flowers," or "Agate has a base of chalcedony, blended with jasper, quartz, amethyst, opal, heliotrope, cornelian, and jade"; or that basalt is an immensely hard solidified "condition" of lava—we presume these and a host of other grotesquely ignorant statements of the same kind are all covered by the apology in the introductory remarks alluded to. The "wholly unscientific" scarpellini, if not overmatched, may at any rate feel avenged. The author remarks that it has been his "endeavour to make out a good case for the dignity and worthiness of the pursuit"; in this he has conspicuously failed, though, treated in a competent manner, no doubt the pursuit would have proved attractive enough. As the work stands, it is merely a handbook for that "hobbyist-collector" who may be found hanging on to the fringe of every science.

*A Manual of Decorative Composition.* By HENRI MAYEUX. Translated by J. GONNINO. Revised by WALTER MILLARD. London: Virtue & Co. 1894.

THIS, though not so described on the title-page, is, we believe, practically a second edition or a reissue of a book the translation of which was unsatisfactory in the first instance, and which has been revised in this respect by Mr. Millard. As we have before observed, there are such excellent books on ornament in English, written by men with far more artistic feeling for ornament than is to be found in the present day in any French or German brain, and illustrated so much better, that we fail to see the object of introducing translations from foreign works on the subject. M. Mayeux's book is a good one of its kind, as far as thought and literary execution are concerned; it is a good *résumé* of what may be called the philosophy or logic of ornament; and being written with adequate knowledge of the subject, contains a great deal of information and suggestion within the compass of a comparatively small and inexpensive volume. But the illustrations are all coarsely executed, and a great many of them are very bad in design, and are more useful as warnings than examples; and this is to our thinking a fatal objection to a book on ornament. In such a book the illustrations should either (if economy is desired) be confined to mere line diagrams such as are necessary to explain the forms referred to, or, if they aim at more than that, they should in themselves be objects of beauty, showing good drawing and good design, which cannot be said of the majority of the illustrations in this book; the drawing and engraving are poor and coarse throughout, the design often has nothing to recommend it. That illustrations of the type we desire to see can be produced without undue cost has been amply proved by Mr. Day's charming little books on ornament, as well as by some other English books; and that have been used to these it is of little use to offer people such illustrations as M. Mayeux's. Apart from these, there is something to study in it; though it is possible that many readers may think that there cannot be much of value in the precepts of a master whose examples are so poor.

*The Cathedral Churches of Ireland: Being Notes More Especially on the Smaller or Less-known of these Churches.*—By T. M. FALLOW, M.A., F.S.A. London: Bempsey & Sons.

THIS is not an architect's book, the illustrations being merely small wood-cuts, giving the general appearance of the churches named, and (which is a very serious omission) no plans are given of any of the buildings. The book is, however, of interest as giving information and general illustration of a good many old Irish churches—cathedrals they are not, except in the ritual sense—the very names of which are hardly known to most English readers; some of the illustrations from old drawings of churches now altered or pulled down are curious and interesting; and the written information is collected and put together with care by a competent archaeologist. Anyone intending to make any kind of tour of the old ecclesiastical buildings of Ireland would find this a useful introduction to the subject, as well as a guide as to what to look for, and where. The well-known cathedrals of Dublin and Kilkenny are omitted (except for the correction of one or two popular misconceptions in regard to the former), as being too well known for the scheme of the book, the object of which is to give

information about the buildings which are less known and illustrated.

*The Vale of Nantgwilt: a Submerged Valley.* By R. EUSTACE TICKELL, A.M.Inst.C.E. London: Virtue & Co. 1894.

THIS is a volume in illustration of the scenery of the Radnorshire valley which will shortly be more or less submerged in the course of the operations for providing the water supply of Birmingham. The literary portion is a curious medley, consisting of a description of the Birmingham water-supply scheme, by Mr. Mansergh (illustrated by a map and a shaded model plan of the water-shed); reminiscences of Shelley at Cwm Elan and Nantgwilt, by Mr. W. M. Rossetti, and an article on the archaeological remains of the district, by Mr. Stephen W. Williams, F.S.A. The main interest of the book lies in the etchings of the scenery by Mr. Tickell, who is evidently an accomplished artist as well as an engineer. These are well executed, and form an interesting memorial of scenes which will soon be changed past recognition. One regrets that the same kind of memorial was not made of the Thirlmere scenes before they were metamorphosed for the Manchester water scheme.

*The London Health Laws: a Manual of the Law Affecting the Housing and Sanitary Condition of Londoners.* Issued by the Mansion House Council for the Dwellings of the Poor. London: Cassell & Co. 1894.

THIS small book contains the pith of the sanitary provisions of the Public Health Act for London, the Metropolitan Management Acts, the Metropolitan Water Act (1871), the Housing of the Working Classes Act (1890), &c., stated in ordinary language and free from legal phraseology. It enables every one who possesses it to understand what requirements are made from him by the London Health Laws, and (which is just as important) what requirements he has power to insist upon from landlords and others on whom he may be partly dependent for the healthiness of his surroundings, and what steps must be taken to give effect to the law. It is a book which all London householders, rich or poor (though it is specially intended as an aid to the poor) would do well to possess themselves of.

*Quantity Surveyors' Tables: Revised and Rewritten.* By a Fellow of the Surveyors' Institution. London: Methuen & Son, 1895.

THIS is a small almanack and diary with fifty-six pages of very useful tables and memoranda of building materials and building operations attached to it. Printed on thin paper, it makes a small fat volume easily carried in the pocket. The memoranda will be useful to architects as well as to quantity surveyors.

*Turning Lathes: a Manual for Technical Schools and Apprentices.* Edited by JAMES LUKIN, B.A. Fourth Edition. Colchester: The Britannia Company.

THE Britannia Company, of Colchester, who publish this book, are manufacturers of lathes and other machine tools, so the work may be looked upon as an addendum to their trade catalogue with which it is bound up. It is not on this account that the information contained is less valuable, and for amateur workers a great deal of useful information will be found; the author commencing with the rudiments of his subject and carrying it as far as it is necessary to go to give a fair knowledge of the uses of the lathe. Since the last edition a good deal of fresh matter has been added, amongst other things a description of an invention for simplifying ornamental work. This is known as Beddow's Epicycloidal appliance, and is fitted to the ordinary slide-rest. It can be used for rose-cutting, eccentric cutting, drilling, fluting, and vertical cutting. There are also additional chapters in this fourth edition on the eccentric and spherical chucks, and on the "goniostat," which is an apparatus for sharpening the cutters for ornamental turning to an exact angle. The purely catalogue portion of the book is also worthy of attention, containing illustrations of a large number of machine tools.

*Odontics, or the Theory and Practice of the Teeth of Gears.* By GEORGE B. GRANT. London: Sampson Low, Marston, & Co., Limited.

THIS is a book of American origin, bearing unmistakable evidence of having been not only written by an American, but having been printed and bound in the United States. It is well to state that the word "Odontics" indicates that branch of kinematic science which is concerned with the

\* The italics are not ours.—Ed.



transmission of continuous motion from one body to another by means of projecting teeth. The average engineer has always been aware that there is, in a general way, a deal of philosophy in toothed gearing; but he does not, as a rule, find his every-day mathematics sufficient to elucidate the whole theory. He is therefore content to use certain time-honoured empirical methods of setting out gearing, mostly derived at second-hand from Rankine's great work. This, of course, is wrong, and it is astonishing—or, at least, it ought to be astonishing—how much power is wasted through ill-designed gearing. So far as we can see, there is nothing very novel in Mr. Grant's book, but he has succeeded in setting forth his subject-matter in a clear and simple manner. His book is an agreeable change from the crabbed style and involved language of some writers on this subject; for there has been much making of books about toothed wheels.

*A History of Watches and other Timekeepers.* By JAMES FRANCIS KENDAL, Member of the British Horological Institute. London: Crosby Lockwood & Son.

THIS is a book for the *virtuoso*, the author, as the representative of an eminent firm of watch-makers, naturally feeling it is not within the province of a writer of books to teach people how to take to pieces or clean timepieces; indeed, he expresses very natural horror at the suggestion of such a course. "No tinkering," he says; "you can do no good, and will most likely cause further damage." With the class of watches which the author's firm produces this is sound advice, but timepieces are now produced so cheaply by the factory system, that an ingenious amateur can afford to purchase a watch simply for the purpose of studying its philosophy without being guilty of undue extravagance. Interesting descriptions and illustrations of the famous timekeepers of the world are given. The opening chapter is devoted to a short disquisition on the division of time. The book is generally interesting, the author having a pleasant easy style.

*The Watch-Jobber's Handy Book. The Clock-Jobber's Handy Book. The Wood-Worker's Handy Book.* By PAUL N. HIASLUCK. London: Crosby Lockwood & Son.

THESE three little volumes form part of a series of "Handy Books for Handicrafts," all of which are by the same author, and are issued by the same firm of publishers. The first two books are useful within the limits which their titles indicate, and the information contained appears to be sound. Amongst the large and ever-increasing class of mechanical amateurs they should command a large sale, for there are few objects more interesting than timepieces, and, moreover, they are things we all possess. There is no reason why a person of ordinary intelligence should not learn, by the aid of these two cheap little books, to take a watch or clock to pieces, clean it, and put it together again. Of course, a certain expenditure would be required in tools. There is no doubt that the owner would be likely to be more painstaking in putting his watch in order than the average jobbing watch-maker, but we would not advise him to make his first essay with a delicately-constructed and costly timepiece. The third book is essentially an amateur's work, and in an unpretending way conveys a good deal of useful information.

*Problems in Machine Design.* By CHARLES H. INNES, Engineering Lecturer at the Rutherford College, Newcastle-on-Tyne. Manchester: The Technical Publishing Company.

THE number of books of this character which the "Engineering student for the honours stage" has had written for his illumination must render the task of selection an extremely embarrassing one, and we fear we can do little to help him on the present occasion, for Mr. Innes gives us no salient points upon which we can hang very definite criticism. His work does not soar above the average, and at the same time it does not appear to contain questionable matter. The chief defect is that too much is attempted in the space.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—Mr. J. T. Irvine writes to say that he was incorrectly reported as saying that the carving from Rothwell Church, of which he exhibited a drawing, was "probably Saxon"; he said it was Norman work but an imitation of Saxon detail. We should rather have supposed "Celtic" would have been the more correct expression.

## Correspondence.

To the Editor of THE BUILDER.

### THEATRE SITES.

SIR,—In the course of the discussion at the Architectural Association, on the 7th inst., there was some comment as to my suggestion that at least two sides of a theatre-site should face thoroughfares, and that a maximum of safety would be obtainable on completely-isolated sites. Mr. Carie, I believe, wished to point out that isolation does not insure the absence of catastrophes, and quoted the Exeter Theatre as an example of an isolated building. Of course, isolation does not ensure an absence of fatalities, but good planning is greatly facilitated, and the possibility of panics caused by accidents in neighbouring buildings lessened. As to the site of the Exeter Theatre, I enclose sketch-plan, together with one of the Vienna Ring Theatre, likewise the scene of a fearful catastrophe. Neither building was isolated. One side was in each case completely built up, and most of the fatalities were due to the necessarily-unfortunate planning.

EDWIN O. SACHS.

### INSANITARY BUILDING LAND AT BIRMINGHAM.

SIR,—I would ask you to give me space in your valuable columns to expose a most pernicious practice, prevalent in and around Birmingham, as regards the land on which houses—jerry-built, and the more pretentious villa residences—are erected.

The ground on which the city of Birmingham are so frequently stand, is, as you are doubtless aware, very billy, and as a consequence it is not infrequent to find that the base of the houses in one street is on a level with the first story or roof of houses in an adjacent thoroughfare. Now, in the suburbs, to improve this state of affairs and also to improve land and make localities safe for building purposes, it is the custom to fill in depressions and hollows by permitting the deposition of rubbish, ashes, and even night-soil in such hollows, in fact, allowing such places to be a "tip" for all kinds of refuse, until this accumulated filth has levelled the ground, when such made ground is given a year or two to settle, and then let or sold for building purposes. This, you will say, should not be, but alas! it is so, and the facts I shall presently relate will open the eyes of the Local Authorities to the cause of much of the diseases—small-pox, diphtheria, and other zymotic diseases which is so prevalent in various quarters of the town at almost regular intervals.

First as regards the rubbish shot on these tips. It is very frequently one sees an advertisement in the *Daily Mail* that a free "tip" is open at so-and-so, or that threepence or fourpence per load will be paid for rubbish to be tipped at such and such a place; and likewise it is sometimes that at some of these tips we find a notice-board exhibited whereon we read that "no night-soil is to be tipped here"—the inference is instructive, *what is shot at these tips it is impossible to mention, as their variety is too great, but it is charming.* On one such piece of made ground not a hundred yards from Salford Bridge, Gravely Hill, something like a hundred loads of spoiled brewers' grains were shot down—nice sound stuff this for building on! It is to be wondered at that a few years after being built, there are several of the houses cracked from roof to base? At another free tip close to the Board School in Aston-lane many loads of limestone and blue lias lime were deposited; while on every tip the majority of the rubbish deposited consists of the refuse gathered out of the dustbins. As a rule the dustbins in the houses and cottages round about Birmingham are emptied but twice a year, so that the piling-up of refuse is almost lively enough to move itself to the tip, for decayed vegetable refuse, old rags, paper, and every article out of the house finds its way to the dust-heap. Such an agglomeration, whether night-soil be added or not, is sufficient to produce germs for all the doctors in Christendom to experiment with, when it is brought into contact with such an article as lime, particularly so, as the cinders that are intermingled with the organic refuse permit the impregnation of air and moisture to the putrescent vegetable and other organic matter. A nice foundation this for a house to be built on! Yet this is the basis of the foundation on which thousands of houses are built, and being built, all round Birmingham.

The following is a particular case of such land "ripe" for building on.—On the margin of a river which is very flat, so that in times of flood the width of the river is more than trebled, some enterprising parties a few years ago, however, reclaimed a portion of land by the deposition thereon of thousands and thousands of cart-loads of such rubbish as specified above. No attempt was made to stake out the stream, or form an embankment to prevent the flood-water from submerging the tipped refuse; gradually, however, the depo-

sited rubbish rose higher and higher, until it stood some 12 or 20 ft. above the surface of the stream. Several acres of "ripe" building land were thus made, and after an interval of a year or so to allow the rubbish to settle, several hundreds of houses were erected thereon, let, and occupied. Now what, I would ask, is likely to be the state of health of the occupiers thereof? Be it remembered that every time the river is flooded it rises several feet, and, as a consequence, the water percolates through the lower stratum of the agglomerated rubbish, and, as a consequence, miasmatic vapours rise upwards, and these noxious gases, by coming in contact with the vegetable and other refuse that has formed a portion of every dust-heap deposited, is sufficient to cause every disease—zymotic particularly—that the human body is liable to. Now the floor of the houses that are built on this made ground is tiled with porous earthenware tiles in the back portion of the premises, and in the front room simply boarded over the ground, no concreted surface being made on the top of the rubbish, and, as a consequence, there is every opening possible for the miasmatic gases, as they rise from the decaying matter beneath, to enter the living-room, and, in fact, fill the house.

Unfortunately these noxious gases do not smell very pungently, are at least not sufficiently strong to affect the olfactory nerves of the occupants of the houses, and therefore these persons cannot conceive of the living death they are exposed to. They may feel a certain listlessness in the morning, lassitude or nausea, in fact, even become epileptic, or suffer with convulsive twitchings of the muscles, or lose the use of some organ of the body; be always going to the doctor, and in a dozen ways be unwell; but they never seem to grasp the cause of their ill-health, and of course it is not the doctor's business to trace the cause to its foundation. In such a case he would not only lose his means of livelihood, but also be quickly brought before the justices for disparaging the landlord's property.

At the present time, the City Fathers (as the parochial authorities proud in the new-born honour of citydom like to style themselves) are rigorously putting builders who fail to put up damp courses to the walls of houses they erect, but this action is, I opine, straining at a gnat and swallowing a camel, as regards the small effect the insertion of a damp-course in such houses as described will have in preventing the houses becoming an unhealthy one; for although the walls may not permit damp to arise, still the miasmatic gases referred to will be generated and fill the house to set up disease. That these miasmatic gases are no myth, I would mention that at one of the houses built on the land referred to at Gravely Hill I saw a piece of leaden water-pipe corroded into holes a quarter of an inch in diameter by the effect of these gases that were generated in the rubbish on which each house was built.

Anticipating that these remarks will bring a storm of virtuous (?) indignation on my head, I hope, nevertheless that they will awaken the "powers that be" to a sense of the insanitary conditions under which modern Birmingham is being founded.

H. L. STANDAGE.

Gravely Hill, Birmingham.

### PROPOSED ASSOCIATION OF PORTLAND CEMENT MANUFACTURERS.

SIR,—In reference to the attempt recently made by Messrs. Knight, Bevan, and Sturge, to form an "Association of English Cement Manufacturers," we should like to call the attention of all interested in the matter to some points which may have been obscured or may have escaped notice. Any firm which joined that Association would practically have declared that it never had and never would make any improvement in the manufacture of Portland cement. Of course, those who are willing to pledge themselves never to advance, sought to cast a stigma on the progressives by substituting the word "adulteration" for "improvement," but this little interested move was quickly exposed by several speakers at the Cannon-street meeting. In the circular issued to convene this meeting, it was stated that the admixture of ragstone and other inert materials with Portland cement, was "bringing disrepute upon the good name that English cement has hitherto borne in comparison for quality with cement of foreign manufacture."

The policy proposed by Mr. Bevan and his friends for the reinstatement of English cement is so remarkably guileless and childlike as to deserve special notice. We are not to make every endeavour to improve our cement, not to compete with German skill, but to fold our hands and to say, "Our cement is made of chalk and clay (as it has been since the flood) and of nothing else. If foreign cement gives better tests, we cannot help it; it only proves that it is adulterated." This may be very magnificent, but it is not business. Mr. Leedham White, however, fully recognised the necessity for English manufacturers not thus slitting with folded hands while foreign competitors are working, when, at the Cannon-street meeting, he said that English cement had not recently been brought into disrepute in comparison with foreign cements, seeing that English manufacturers were actually exporting even better cement than they did a few years ago; but,



said Mr. White, "we have been distanced by German skill and German competition, which is a different thing. I am most anxious that we should not be debased from imitating the German skill. We do not want to be debased, as people who intend to make progress in every shape and way, from taking advantage of scientific research."

It must be remembered that the various tests were not invented in the interests of the manufacturer, but in those of the consumer. The engineers and chemists who invented the tests invented them to compel the manufacturer to improve his cement. It is therefore rather illogical when a manufacturer improves his cement to meet the higher specifications, to throw doubts upon the efficacy of the tests. English manufacturers would, if this were accepted, be placed in the position of having foreign cements preferred to theirs because they passed higher tests, and at the same time they would be forbidden to so improve their manufacture as to make it meet these higher tests. But, as Mr. White pointed out, when a manufacturer supplies cement which meets all provided tests and analyses, he has fulfilled his legal obligations, and when he goes beyond this and supplies cement which besides meeting all tests will give enduring satisfaction, he has fulfilled his whole moral duty.

Now, leaving the general aspects of the question, we should like to point out that at the Cannon-street meeting Mr. Holt, on our behalf, frankly owned that we had improved our cement by the addition of it of Kent ragstone of a special quality and in a carefully-considered proportion. He strongly deprecated such an addition to the cement being stigmatised as an adulteration, and courted the fullest inquiry into the improved manufacture. A subsequent highly-influential meeting of the Cement trade at the London Chambers of Commerce has acceded to his request by the appointment of a committee having power to call in expert evidence in reference to the addition of Kent ragstone in the manufacture of Portland cement.

At the Cannon-street meeting Mr. Holt, in spite of an attempt which was made to prevent his giving the information, brought out the fact that his manufacture improved the cement in color, in strength, and in the sand tests. The tests were:—At seven days, 492 lbs.; at three weeks, 556 lbs.; at seven weeks, 656 lbs.; at three months, 740 lbs.; at six months, 790 lbs.; at nine months, 975 lbs.; at eleven months, 1,000 lbs.; and at twelve months, 1,010 lbs. With sand tests (three and one) nine months gave 70 lbs. on one side, and 450 lbs. in another.

In reference to these tests, we should like to call special attention to the excellence of the long-time tests. The long-time test, when three parts of sand were added to the cement, is most important, as no cement of indifferent quality could give such high results when mixed with these proportions of an inert matter such as sand. This shows that our improved cement in the neat state must contain less inert matter than the old-fashioned cement, because if it were no better than the old cement it would, when mixed with three parts of sand, be bound to give a worse result for tensile strain when tested.

It must be borne in mind that Portland cement is only the name for an article of admixture, which, if it satisfies the provided standard tests and chemical analyses, and, in addition, the tests of time and exposure in actual use, cannot be said, with the least show of reason, to be adulterated, because there may happen to enter into its composition an ingredient or ingredients whose beneficial action has only lately been discovered. Still less justifiably can it be called adulterated when it gives results under all tests far beyond anything hitherto demanded in any specification.

MACVOY & HOLT.

#### THE PUBLIC HEALTH (LONDON) ACT, THE LONDON COUNTY COUNCIL BY-LAWS, AND "OPEN" SOIL-PIES.

SIR,—The newspaper reports of the case which was decided on the 10th inst. at the South-Western Police-court are not altogether correct, and are likely to mislead, so that I shall be glad if you can insert the following remarks in reference to it.

The proceedings arose in regard to a house drained upon the system advocated by Mr. Norman Shaw, R.A., and still, I believe, invariably used by him outside the jurisdiction of the London County Council. The Vestry of St. Mary, Battersea, not having any other instances of the system except the estate with which I am connected, after it had been in use there for twelve years without evil consequences, notwithstanding that its officers had given the usual supervision then given to drains, that the freeholders' surveyor accepted it as satisfactory, the Vestry four months ago served notices on every house to the effect that "nuisance existed," and must be remedied by carrying out the By-laws of the London County Council, as set forth for new buildings, the chief point being to abolish "open heads," and continue the soil-pipe above the roof in the way now adopted.

As nothing less would suit them, and as the tenants were satisfied with the *status quo*, a test case was taken, and two alternatives were suggested to thrashing out the question. The pipe being clean and there being no bad smell, the Vestry's solicitor

at length gave up contending that nuisance existed, but said that such might arise, and they ought not to wait until it did so. Counsel on my behalf submitted that after tacit acquiescence for twelve years the Vestry were estopped from complaint, even if sanitary science had since shown that there was a better system, that even if nuisance existed it was to the individual and not to the public, and the Act of Parliament relied upon was never intended to apply; and further (explaining the model produced), the advantages of the system were manifest in so diluting any slight emanation from the perimeter of the pipe with fresh air as to render it perfectly innocuous.

Mr. Denman, in giving judgment, declined to hold that sanitary fittings were likely to produce a nuisance because they were not up-to-date. If that contention were allowed it would mean that all old fittings would have to be pulled down and replaced. The vestry had failed to establish the allegation, and he therefore dismissed the summons and allowed three guineas costs.

It is perhaps not too much to say that this Public Act of Parliament is often stated by various Sanitary Authorities and complied with under fear of consequences by owners of property, but although, in any case, the attempt is frustrated, it is not improbable that attempts will be made to obtain yet more stringent powers to enable the London County Council system to be forced upon old as well as new buildings, by all manner of needless trapping appliances objected to by all managers of property. Any such attempts I think should be carefully watched and frustrated if possible.

EDWARD W. HUDSON, F.S.I., &c.

#### VENTILATION.

SIR,—If it were not for the fact that ventilation is a serious subject for an architect, the present controversy would be exceedingly amusing. The enterprise with which mechanical ventilation has been written down by certain individuals is worthy of a better cause, but when it comes to inundating architects with a sort of death's-head-and-crossbones pamphlet, warning them from mechanical ventilation, the whole thing becomes a farce.

It must be evident that the gentlemen puffing those beautiful contrivances, somewhat resembling humming-tops, with which they ask us to adorn our buildings, are getting alarmed, and take refuge in flaring advertisements and pamphlets.

I have approached mechanical ventilation with a considerable amount of caution, as it is a somewhat expensive method of dealing with a most difficult subject, but I have come to the conclusion that for buildings of a certain class and beyond a certain size, it is distinctly preferable to any other method if properly carried out.

For buildings of the ordinary type and of lesser size I should certainly give preference to the open fire, but it should be the means of introducing fresh, warm air, as well as heating the room and extracting the foul air.

As for the elegant patent extracting arrangements (the illustrations and advertisements of which are ever with us) my experience is that a simple ridge-tile, similar to Thompson's patent ridge-tile, is preferable, and certainly less unsightly; but all these contrivances fail under certain conditions of the atmosphere, and it is then that a motive power, in the shape of heat or engine-power, is required.

ALBERT N. BROMLEY, F.R.I.B.A.

Nottingham.

#### THE FILTRATION OF SEWAGE.

SIR,—Permit a brief reference to the "Note" on above subject regarding the sewage filtration experiments of the Massachusetts State Board, to show the possibility of largely increasing the results given, which, taking the *Builder's* estimate is about forty-seven gallons per yard per day continuously for seven days.

In 1888 the writer conducted an experiment with sewage, taken direct from one of the town sewers of Kingstown. The main object, in this case, was to determine "by aeration" whether the nature of the fermentation in sewage was or was not within control. Apart from this question the operation must have had a precisely similar effect on sewage to that produced by the preliminary filters 15b and 16b, *re report*, and there is little doubt that with a similar effluent to that hereafter described, the purification effect of filter 12a would be largely increased, as seen from the following data regarding the area, sewage, sludge, and the time occupied in the experiment.

The experiment was continuous from April 11 to May 5, or twenty-four days. The sewage dealt with a continuous stream of about 1,000 gallons a day. The total area occupied by the apparatus employed was 12 ft. by 2 ft. or 24 sq. yds., consequently the sewage was purified at the rate of 250 gallons per yard per day for twenty-four days, or about five times the volume dealt with by filters 15b and 16b of sewage probably much more difficult to purify, for the oxygen required ranged from 10 oz down to 2 1/2 grains per gallon. The purification effected was an average of 77 per cent, for the whole period of twenty-four days.

Regarded as a method of sludge disposal, analysis of sewage, average gas in suspended matters, alone upwards of 3 cwt. dry, whereas the total sludge products dried to 10 per cent, moisture weighed but 64 lbs., showing a reduction from natural causes of about 80 per cent.

I should mention that the elimination of the suspended matters averaged 90 per cent, while the organic constituents left in the effluent were practically divided by nitrites and carbonate proportion, or a condition in exact accord with the bacteriological function we know to operate on the soil.

The above results have been much exceeded in subsequent experiments on a smaller scale when combined with production of electricity with the object of securing the constant disinfection and ultimate destruction of the volatile organic impurities of sewage by means similar in effect to those relied upon for a "like purpose" in some of the manholes, &c., connected with the London main sewers.

HILL-HARTLAND.

#### THE BROMPTON ORATORY.

SIR,—It would be just to record that I was appointed *joint architect* with the late Mr. H. Gribble, and that the working plans were drawn out, and the works carried out to the completion of the roofs, by Mr. Gribble and yours obediently.

T. WALFORD.

\* \* The design selected in competition, however, was that of Mr. Gribble solely, as far as we have ever heard.—Ed.

#### The Student's Column.

##### DETAILS OF RURAL WATER SUPPLY.—XXV.

WELLS (continued). HEAD LION-ONING.

**S**PECIFICATION of a well and other works required to be constructed for Mr. —, on land adjacent to the main road leading from — to —, in the Parish of —, in the County of —.

The works comprised in this contract are the excavation and lining of a well, and other works, as shown on the drawing (fig. 61) attached to this specification, and hereinafter more particularly detailed and described.

The site of the well is shown on the aforesaid drawings, and the strata will probably consist of—

Alluvium .....	2 ft.
Sand and gravel .....	4 "
Soft and hard marl .....	64 "
Sandstone .....	10 "

The well is to be excavated or sunk to a depth of 80 ft., and 4 ft. 6 in. diameter in the clear inside the brickwork lining. The excavation is to be trimmed back of sufficient width for the lining and concrete backing, or 7 ft. 6 in. in diameter where lining is inserted with concrete backing, and 6 ft. in diameter where brickwork lining only is inserted, the remainder of the excavation where lining is not found necessary is to be made 4 ft. 6 in. in diameter, and neatly trimmed to the circle.

The excavated material is to be removed by the contractor as part of this contract.

Blasting with explosives will be permitted, but no shots are to be fired within one foot of the sides of the excavation.

The brickwork lining is to be 9 in. in thickness, built solid in Portland cement mortar, and to consist of header and stretcher-courses, constructed in sections on the system known as "underpinning," but no section of the brickwork is to exceed one-fourth of the circumference, or 4 ft. in vertical height as a maximum. Great care must be taken in measuring the height of the courses so as to avoid wide-closing joints. The brickwork is to be built in, as the sinking proceeds where the ground is not strong enough to stand alone. No vacant spaces are to be left behind the lining, but all such spaces must be filled in with fine cement. The lining is to be kept perfectly plumb, and worked from a radius-rod off the centre-line.

The ring of cement concrete backing to the brickwork is to be carried to a depth of 20 ft. from the surface, and to be 9 in. in thickness, and well rammed into its position behind the brickwork.

The contractor is to provide, as part of this contract, all carriage, labour, materials, tools, pumping apparatus, or other means of lifting the water during the execution of works, and any other apparatus necessary for the due and proper execution of this contract.

A hand-windlass of elm-wood, with substantial standards and frame, is to be provided and fixed



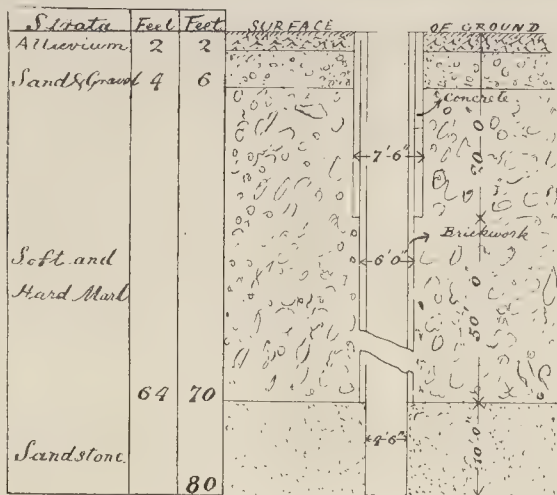


Fig 61.

analysis, 5 parts of carbonate of soda to 100,000 parts of water being an extreme case.

### 2.—Insufficiency of Dissolved Silica.

This opinion has been strongly advocated by Dr. Tidy and other eminent chemists, as the result of observations which appeared to show that the activity of a water towards lead was destroyed when it contained upwards of half a grain of silica per gallon. It would seem, however, that this is not invariably the case, from the following instances:—

(a) Water from the Punch Bowl, Hindhead, which contains 0.831 grs. of silica per gallon, is said to act vigorously on lead.

(b) Experiments made by Professor Williams, of Sheffield, showed that silica added in definite quantities to an acid water did not diminish its solvent action upon lead.

(c) The High Level water at Sheffield acted vigorously upon lead whilst containing a larger proportion of silica than the Low Level water, which acted slightly or not at all upon lead.

Besides this Dr. Sinclair White (1889) is of opinion that, "the amount of silica which moorland water will take up from flints, even after long contact, is very small, and in practice it would seem to be exceedingly difficult, if not impossible, to silicate by means of ordinary flints some of these waters to the extent of containing half a grain per gallon. Mr. A. H. Allen has never succeeded in adding more than a quarter of a grain per gallon in this way, and Professor Percy Frankland's experience is of a similar character."

### 3. Absence of a Sufficient Proportion of Dissolved Carbonic Acid. (CO<sub>2</sub>).

This is tantamount to saying that a water should possess a certain degree of temporary hardness, and this theory is borne out by Dr. Percy Frankland, who states that such waters "may be generally considered above suspicion."

### 4. Deficiency of Salts, especially of Phosphates, Carbonates, and Sulphates.

In other words, soft waters are dangerous, and perhaps this is the most popular opinion upon the subject. It must be remembered, however, as already stated, that an excess of lime in a water tends to increase its activity towards lead; and that hard waters, which derive their salts from sewage-polluted sources (nitrates, nitrites, &c.), are especially active towards lead.

### 5. Presence of Sewage-matter, especially of Nitrates and Nitrites.

Although this condition of a water undoubtedly renders it more active towards lead, it is almost needless to say that such pollution is not an indispensable cause.

It would appear that much time has been wasted in attempting to trace the property possessed by certain waters of attacking lead to one final cause, instead of admitting that many causes may be at work at the same time, either separately or conjointly.

With regard to the most favourable conditions under which water will attack lead, there is nearly as much variety of opinion.

A frequently-stated dogma is that new lead only is to be feared, old lead becoming protected by a coating of carbonate of lead which forms upon its surface. Dr. Frankland has, however, shown that some waters act more and more upon pipes from day to day. It was originally believed that carbonate and sulphate of lead were insoluble in water; this was due to an error in the method adopted for analysis, which assumed that sulphide of lead was insoluble in water charged with sulphuretted hydrogen. Again, it has been shown that the coating of carbonate of lime and lead, which forms on a lead surface exposed to an active water, is pervious and does not act as a protection. This coating also is very liable to scale off as a result of vibration—e.g., in pipes, the opening and closing of taps, the passage of vehicles, change of temperature, &c.

The influence of pressure upon the action of the water has also led to much diversity of opinion. Dr. Sinclair White states, as the result of experiment, that, "Other things being equal, the greater the pressure under which the water is stored the greater amount of lead is taken up. This influence is considerable, but no amount of pressure will, of itself, render a harmless water active towards lead."

There is more agreement upon the influence of temperature, and Dr. Sinclair White's statement that, "Other things being equal, an increase in the temperature of the water increases its lead dissolving power," may be taken as the general opinion. This point taken in connexion with the remarks made above upon "temporary hardness" is interesting.

at the top of the well, after the sinking and other operations have been completed. A best Manila rope, 2½ in. in circumference, with swivel attachment, and a strong elm or oak bucket, holding not less than 3 gallons, are also to be provided as part of this contract.

The works are to be completed to the satisfaction of Mr. —, within two months after the date of the signing of this contract.

Payments will be made weekly, at the rate of 80 per cent. of the work executed.

#### Materials.

The bricks are to be of approved manufacture. The cement-mortar is to be composed of one part Portland cement and three parts clean furnace-ashes or sharp sand.

The cement concrete is to be composed of one part of Portland cement, one part of clean, sharp sand, and three parts of small broken stone.

The timber is to be of the best-seasoned elm, free from all imperfections.

All other materials are to be of the best of their respective kinds.

Estimate for Sinking and Lining a Well 80 ft. deep and 4 ft. 6 in. in diameter.

Cub. Yds.	Excavation.	At per Cub. Yd.	s. d.	s. d.
9½	Alluvium, Sand and Gravel.	1 2	0 17	1
2½	Soft Marl	4 6	5 16	6
5½	Hard Marl	6 6	16 19	7
10	Sandstone	10 0	2 17	6
30	Brickwork in Cement Concrete.	40 0	6 1	0
11½	Portland Cement Concrete.	16 0	9 8	0
	Miscellaneous.			
	Em. windlass, frame, bucket and rope, complete	3 1	6	
	Wooden cover door	0 6	6	
	Removing excavation to spoil	4 10	0	
	Lifting Water	5 0	0	
		112	3	8

#### LEAD POISONING.

Constant reference has been made in the course of these papers to the solvent properties which water sometimes possesses with regard to lead. This subject was forced upon public attention a few years ago on account of its serious consequences at Sheffield and other northern towns, where the water is very soft in character, and is principally derived from moor-land. These alarming outbreaks led to much careful investigation, both as regards the peculiar constituents of such waters as are most liable to become polluted with salts of lead, as well as the circumstances which tend to facilitate such pollution.

Lead is a cumulative poison, and if water containing the most minute quantities is constantly employed for dietetic purposes lead poisoning (plumbism or saturnism) must eventually supervene. The absorption of lead into the system

constitutes a predisposing cause of many diseases, and there is a liability of symptomatic treatment, the true origin of the disorder being undiscovered. In fact, the theory has been propounded that nearly all cases of gout, Bright's disease (nephritis), and many other diseases, might be traced to lead poisoning.

There is perhaps no subject upon which more diversity of opinion exists amongst scientists than that which relates, firstly to the essential characteristics of the water itself, and secondly to the most favourable conditions under which water will attack lead. With regard to the activity of the water there are several theories:—

1. Presence of acidity in the water.
2. Insufficiency of dissolved silica.
3. Absence of a sufficient proportion of dissolved carbonic acid (CO<sub>2</sub>).
4. Deficiency of salts, especially of phosphates, carbonates, and sulphates.
5. Presence of sewage matter, especially of nitrates and nitrites.

#### 1. Presence of Acidity in the Water.

There is no doubt that certain waters, especially from moorland sources, possess a distinct acidity, and that their lead-dissolving properties are directly proportional to their degree of acidity. This was shown to be the case by the experiments conducted by Dr. Sinclair White in connexion with the Sheffield outbreak, and communicated in a paper read at the meeting of the British Medical Association, in Leeds, in August, 1889.

The nature of this acid is, we believe, yet a mystery. One opinion is that it consists of sulphuric acid, derived from the oxidation of iron pyrites; another opinion is that the acid is of vegetable origin, and is due to the decomposition of vegetable matter (e.g., peat), possibly due to the action of bacteria.

The remedies proposed in this case are:—

- (a) Contact with fragments of limestone.
- (b) Admixture of a proportion of milk of lime.
- (c) Admixture of a proportion of carbonate of soda.

Contact with fragments of limestone, in addition to the admixture with the water of a certain quantity of quicklime, has been adopted with satisfactory results at Keighley. As the acidity of the water varies from time to time, the quantity of alkali necessary should be periodically determined by analysis, and added to the water in the form of powder or as milk of lime. This is the more important as it has been proved that an excess of lime increases the activity of water towards lead. Dr. Tidy is reported to have said that the beneficial action of limestone was due simply to the silica which it contained. Fragments of limestone become coated after a few weeks and require renewal; brushing is said to be effective.

The admixture of a proportion of carbonate of soda with the water has been strongly advocated by Dr. Percy F. Frankland (Sanitary Institute Congress, Brighton, 1890). The quantity to be used must be determined from time to time by



It seems to be generally accepted that lead surfaces exposed alternately to the action of air and water are more liable to be attacked; also that water becomes more active by becoming charged with air.

Where the water is acidulated its action is much increased when it can bring into circuit with the lead surfaces of iron, copper, zinc, brass, &c.; in such cases an electric current appears to be set up, the lead being the soluble electrode.

The importance of investigating the action of a proposed water-supply upon lead must be impressed upon the student. It must be borne in mind, in conducting this investigation, that the quality of a water from the same source varies considerably in this respect, and that all the conditions capable of affecting the question must therefore be carefully ascertained.

When, however, the active property of the water towards lead has been discovered subsequently to the construction of the works, in addition to the best practical measures being taken by the Authority to counteract the solvent property before the water leaves their reservoir, information (in the form of leaflets) should be distributed amongst the consumers, so as to enable them to take such protective measures as will minimise the danger. The following recommendations have been suggested by Dr. Frankland:—

(1.) That no water should be collected for drinking purposes until after the tap has been allowed to run for such a length of time as will presumably clear the service-pipe, and that drinking or cooking water may, therefore, be advantageously collected immediately after a considerable quantity of water has been drawn for other domestic purposes.

(2.) That the filtration of the water through any form of animal charcoal filter practically guarantees its absolute freedom from lead.

(3.) That hot water acts more powerfully on lead than cold, and that, therefore, metal teapots and other soldered vessels for holding hot water should be avoided as much as possible.

It is an interesting fact, not yet satisfactorily explained, that filters composed of "animal charcoal" have the property not only of removing lead after it has been dissolved, but of removing from an active water its property of dissolving lead, and that this property is continuous.

Another point to be remembered is that the lead from which pipes are usually constructed is not chemically pure. They generally consist of two-thirds of new and one-third of old lead, the latter having been already used, and containing tin, zinc, antimony, and other metals, which facilitate the formation of electric currents.

#### GENERAL BUILDING NEWS.

**CATHOLIC POOR-LAW SCHOOLS, LEYFIELD, WEST DERBY, LANCASHIRE.**—On the 13th inst. the Leyfield Catholic Poor-Law Schools were opened. The school measures 238 ft. across the south-west front, and 113 ft. across the north-west side. The chapel and dining-room are built larger than is required at present. The school consists of four floors, including the basement, which contains the larders, beating-rooms, and temporary work-rooms. The ground floor contains the reception-rooms, school and class-rooms, sisters' parlour and dining-rooms, the kitchens, business-rooms, boot-rooms, and the children's dining-room, 76 ft. long, and 30 ft. wide. The first floor contains the chapel, 107 ft. long, 30 ft. wide, and 20 ft. high, with a smaller side-chapel for the sisters, three dormitories, each about 40 ft. long and 30 ft. wide, clothes-rooms, lavatories, bath-rooms, &c. The second floor is arranged similar to the first floor. The building is warmed by low-pressure hot-water pipes. The building is faced with common brickwork, relieved by red Ruabon brick string-courses, arches, &c., and red Rainhill stone. Messrs. Sinnott, Sinnott & Powell were the architects, Mr. R. J. J. Irwin the clerk of the works, and Messrs. R. Wearing & Sons, of West Derby, the contractors.

**MISSION HALL, LOVELLS, BIRMINGHAM.**—The foundation-stone of a new mission-room in connexion with St. Silas' Church, Lovells, was laid on the 12th inst. The building, which is being erected from the plans of Mr. J. P. Osborne, of Birmingham, by Mr. Thomas Elvins, builder, of Scho Hill, is situated at the corner of Nursery-road and Wellesley-street, on a site formerly occupied by a temporary iron structure. The cost will be about 1,000l., and accommodation will be provided for about 350 people.

**THE BUILDING TRADE IN ABERDEEN.**—During the year the house-building trade has been very active in Aberdeen. The plans of new buildings approved of by the Town Council may be classified as follows:—Dwelling-houses, 222; blocks of shops and dwelling-houses, 8; cottages, 7; hotels, 2; workshops, factories, &c., 29; miscellaneous (including warehouses, stores, stables, and small

offices), 23; alterations and additions to various premises, 51; and public buildings, 13. The new dwelling-houses will accommodate about 5,000 individuals. The public buildings include one new church, a savings bank, one large public school and additions to three others, a skin hospital, additions to Sailors' Institute, a soup-kitchen (rebuilding), and extensions at King's College and Marischal College. Among miscellaneous public works carried out in the city during the year may be mentioned the extension of the tramway system to Old Bridge of Dee and the reconstruction of the track on the Woodside section, the introduction of the electric light into the centre of the town, and the construction of a new service water reservoir at Cattofield. Large public schools are to be built shortly at Torry and Kittybrewster, and probably also at Old Aberdeen, while extensive additions are to be made at St. Paul-street and Albion-street public schools.

**SCHOOL BUILDINGS, STONE, KENT.**—A meeting of the Stone School Board was held on the 8th inst., for the purpose of inspecting and opening their new buildings, which have been built on the Brent, near Dartford, close to the Asylum. They are built with the infants' department facing the road. Accommodation is provided for 350 children—130 boys, 120 girls, and 100 infants. The house for the head-master has been built on the front of the site. The warming is by means of open grates. Mr. L. Seager, of Sittingbourne, was the contractor. The gas-fittings and grates were supplied by Messrs. Fowle Bros., of Gravesend, desks by the Bennett Furnishing Co., and Mr. J. T. Walford, of Northfleet, was the architect.

**PAVILION THEATRE, MILE END.**—This theatre has just been entirely remodelled under the direction of Mr. Ernest Runtz, architect; Mr. C. J. Phipps acting also on behalf of the trustees of the debenture-holders. The one approach from the main road is now appropriated to the stalls, boxes, and grand circle only, and for the pit a large area of ground has been acquired and a new approach erected adjoining the principal entrance. The main entrance in Whitechapel-road has been entirely reconstructed; it is built of terra-cotta, manufactured by Messrs. Doulton; the three approaches are separated by Doric pilasters and piers, surmounted by an entablature of the same order with a balustrade over; from the end piers rise coupled Corinthian pilasters, surmounted by a semi-circular arch, 16 ft. in diameter. On the first floor is the Board-room, above which is a circular opening for the illuminated advertisements and notices of the entertainments taking place. The space surrounding this circular opening is occupied by figures of Tragedy and Comedy, modelled by Mr. William Neatby. The auditorium has been considerably altered, the old ceiling removed, and a new one erected at a greater height, thereby giving an uninterrupted view from the gallery. The ceiling is painted by Messrs. Nepperschmidt & Hermann with allegorical figures and cupids. The level of the pit and stalls has been altered, and the whole of the auditorium has been redecorated, re-seated, and re-upholstered, the latter portion of the work being carried out by Messrs. A. R. Dean & Co., of Birmingham. Over the stage the old roof has been removed, the building carried 32 ft. higher, and a huge mansard formed, having a total span of 64 ft. On the west side the stage has been extended and a painting-room provided beyond this is a suite of dressing-rooms. At the back of the stage the dressing-rooms have been entirely reconstructed, with fireproof-floors and partitions. On the stage-level are the hall, green-room, and quick-change room, and in the basement a room for the orchestra, with music-store, &c., and emergency exit. The electric installation is by Messrs. Moody Brothers. A new stage has been laid, with all modern improvements, by the Company's stage machinist, Mr. J. Wicks. The auditorium is lighted by incandescent gas-burners. There is a complete set of hydrants in the building, supplied by Messrs. Merryweather & Co. Messrs. Colls & Sons have carried out the structural alterations and decorative work, and Mr. G. McLellan Ford has acted as clerk of works.

**RESTORATION OF BLISLAND CHURCH, CORNWALL.**—Blisland Church, about six miles to the north-east of Bodmin, has just been restored. It was originally, says the *Western Morning News*, a little cæteriform building of the Late Norman period, and to it, in the age of perpendicular architecture, there were added a tower, north and south chancel aisles, and a south aisle; but the tower was not built, as usual, at the west end, but at the end of the north transept. There is also a curious erection on the south side in place of the old transept, now known as the "room of the Virgin." The exterior of the church in 1638, by one Obadiah Reynolds, whose property afterwards passed to the Morsheads, the present owner being a minor, the son of Mrs. Glencross, of Colquhoun. The church is dedicated to St. Pratt, a British saint, whose record is lost. The church has been transformed in appearance, though the restoration has been strictly conservative. The external roofing had to be new throughout, but the wagon-headed ceilings of the nave and aisles have had nothing done to them, and the old bosses, corbels, and carved wall-plates remain. The channel roof had, however, to be recelled, for here

there was nothing but lath and plaster, and that was in a ruinous and dangerous condition. The new woodwork is in oak, an exact copy of the old nave roof, and the spaces between the ribs are filled in with a special fibrous plaster, manufactured by L. H. Turner, of London, and the figures on alternate panels representing the Holy Name and the Blessed Sacrament. The chancel has also been newly paved, and a new altar has been erected 7½ ft. long in one block of granite from a quarry in the neighbourhood. The chancel has been restored by the rector, and choir-stalls are shortly to be placed there. The perpendicular window in the end of the south chancel, which has been filled with stained-glass by Mrs. Lucy Edward-Collins. The artists were Messrs. Bucknall & Comper, London. Not much work has been done to the nave except the re-roofing and seating, which is not yet complete. The old Norman font, which has been cast out into the churchyard for some hundreds of years, has been brought into the church again and placed on a new granite base. The floor has been cemented and laid in the passage-ways with Delabole and Portland stone, and under the seats is to be oak parquet. At present the nave is seated with chairs, and a plain temporary wood-screen runs across the chancel and its aisles dividing them from the nave. A good deal has been done to the roof of the tower, which has been new leaded. There have been no discoveries of importance during the work of restoration. The architect was Mr. F. C. Eden, of Holborn, and the work was done by Mr. Pett, masonry; Messrs. Worth & Sons; and Mr. Nankivell, carpentry. The total cost of the work has been about 1,200l. or 1,300l.

#### SANITARY AND ENGINEERING NEWS.

**WEST RIDING RIVERS PURIFICATION AND SHIPLEY DRAINAGE.**—Major-General C. Phipps Carey held a Local Government inquiry at the Manor House, Shipley, on the 5th inst., with reference to the application of the Shipley Local Board to borrow 55,000l. for the purposes of sewerage, sewage disposal, and the erection of a refuse destructor. Mr. J. H. Woodhead, Civil Engineer, having explained the system of sewers proposed for the Windhill section of the district, which are in the hands of his firm, Mr. M. Paterson, M.Inst.C.E., described the works designed by him, consisting of the main outfall sewers, the works of precipitation, and the land filtration works. The main outfall sewer, which is 17,118 ft. long, the Valley-road outfall, and the Red Beck outfall, are the principal sewers, and include seven tunnels, three of which are under the canal, a mill-yard, and a mill respectively; cast-iron pipes along the river-bed; several beck and railway-crossings; and a heavy retaining-wall at the River Aire. The premises of no less than eight mills, foundries, tanneries, and other large works are intersected, including the well-known Salthill Mills, which are traversed for nearly 200 yds. in tunnel. Pumping will be necessary, and pumps are to be provided capable of lifting an extreme limit of 100 gals. per minute, 47 ft. high, steam for which will be raised chiefly by a Horsfall's destructor. A tank sewer, holding 280,000 gals. storage, precipitation-tanks, holding 12 hours' dry-weather flow, or 1,120,000 gals., will be provided. After precipitation, the clarified sewage will be passed into 12½ acres of land adapted for filtration. Besides this area 16 acres are reserved for the future needs of the district. After the inquiry the inspector made an inspection of the site of the proposed works, specially examining the difficult lines of the outfall sewers. The population of Shipley is about 25,000, and storm-water is at present turned into the sewers, but will be excluded in future extensions.

**SEWERAGE SCHEME, NEW MILLS.**—The Local Board of New Mills have for some time past had under consideration plans for the sewerage of the town and sewage disposal submitted by Messrs. W. H. Radford, Nottingham; Fowler & MacLure, Stockport; Bancroft, Manchester; and W. Spinks, A.Inst.C.E., of Leeds and Manchester. At the last meeting they adopted those of the latter engineer, and appointed him to proceed with the necessary work.

**THE GLASGOW BRIDGE REBUILDING CONTRACT.**—The Glasgow Town Council Bridge Committee held a meeting on the 13th inst., at which the estimates for the rebuilding of the Glasgow Bridge at Jamaica-street were considered. Twelve offers were sent in, out of which the three lowest were selected and sent to the measure to be checked, with a view to the ultimate decision. These three estimates were—Messrs. George Lawson & Son, foreign granite, 76,600l.; and British granite, 78,000l.; Messrs. Morrison & Mason, foreign or British granite, 81,176l. 5s.; and Messrs. James Goldie & Son, foreign granite, 91,896l. 16s. 8d., and British granite, 93,687l. 2s. 4d. It was decided to recommend to the Town Council that the offer of Messrs. Morrison & Mason be accepted, the bridge to be built of British granite, and the good material in the old bridge to be used in the construction of the new bridge.

#### STAINED GLASS AND DECORATION.

**PULPIT TO FRAMFIELD CHURCH.**—A new pulpit has been erected in the parish church of Framfield



Sussex. It is designed in the style of the fifteenth century, and consists in plan of five sides of an octagon. The upper portion is of wainscot oak; each side has a moulded arched panel, with crocketed hood-mould. The panels are filled with sculptured figures in very high relief—i.e., Our Lord in the act of teaching in the centre, flanked by the four Evangelists with their respective symbols, each standing on a moulded pedestal. The pedestal is of polished mottled alabaster, following the plan above, with a boldly-moulded capital and base. The steps, four in number, are of Portland stone. The whole of the oak is left clean from the tool. The work has been executed by Mr. James Forsyth, from the designs and under the superintendence of Mr. B. Edmund Ferrey, F.S.A.

WINDOW, KINGTON CHURCH.—A memorial window was fixed in the south transept of the parish church at Kington recently. There are three lights, which are filled with subjects of large size, surmounted by canopies. The subjects represent:—Our Lord Healing the Sick; Our Lord in the House of Martha and Mary; and the Blessing of Children. In the tracery are emblems of the four Evangelists, &c. The work was carried out by Messrs. F. Holt & Co., of Warwick.

### FOREIGN AND COLONIAL.

FRANCE.—Though 664 applications were made to compete for the 1900 Exhibition buildings, only 112 designs have been submitted. The competitors have been elected as their representatives on the jury, the following architects: MM. Laloux, Mayeux, Guadet, Coqart, Pascal, Laviot, Paul Sédille, Vaudremer, and Gninain. The Académie des Beaux-Arts has given, as an architectural subject for the Leclerc competition, "The pavilion for the products of the Savres factory at the 1900 exhibition." A competition has been opened for the design for a monument to Watteau, to be erected in Luxembourg Garden. The models for it will be exhibited from the 5th to the 8th of January.

It is announced that M. Turcan, the sculptor, who gained the medal of honour of the Salon two years ago by his fine group "L'Épave," is in very bad health and his friends are very anxious about him.

The Metropolitan Railway Committee of the Municipal Council of Paris has recommended the rejection of the proposals of the Public Works Department. Its report will be submitted to the General Council. A terra-cotta copy of the seated statue of Versailles by Houdon has been presented to the Versailles Library. The Municipality of Nantes has decided to fill up the ditches of the ancient château of Nantes, one of the most interesting and curious relics of feudal architecture in France. The project has been strongly opposed by the Commission des Monuments Historiques, who demand that the château should be left intact and retain the appearance which it has preserved for 700 years.—A Fine Arts Exhibition is to be opened at Bordeaux on February 1, closing on March 31.—A Municipal Casino for Rochelle is to be commenced shortly, to be built on the Champ-de-Foire estate, near the sea.—A large railway hotel is to be built at Lyons, in connexion with the main railway station.—The Carpeaux Museum at Valenciennes has received an addition in the shape of a terra-cotta bas-relief representing "Ulysses recognising Achilles in Female Disguise at the Court of Lycomedes." The work was done by the eminent sculptor, "en loge," in competition for the Prix de Rome.—The Décoré is announced, at the age of 88, of M. Jean Gigoux, who was the eldest among contemporary French painters. Some account of his life and works will be given in the next "Letter from Paris" in our pages. M. Gigoux has left to his native town of Besançon a fine collection of ancient and modern paintings and drawings, which would have found, perhaps, a more suitable home at the Louvre.

GERMANY.—In the Imperial Budget for 1895-6, which will shortly be laid before the House, the following items of interest to the architectural world are provided for, viz.: 6,600*l.* for the further decoration of the New Houses of Parliament; 35,000*l.* as a second instalment to the National Emperor William Museum; 1,800,000*l.* for Military Building works (this sum includes new barracks at Halberstadt and Torgau, a garrison church at Dusseldorf, the rebuilding of the War Academy at Potsdam, and the acquisition of various lands as drill-grounds); 90,000*l.* for dry docks at Kiel and Bremen; 9,000*l.* towards the rebuilding of the Chief Post Office at Berlin, and over 125,000*l.* for post offices and sites in other places.—The recent issue of the Royal Academy of Arts refers in strong terms to the inadequacy of the present buildings "Unter den Linden." The Empress Augusta memorial church in the Invaliden Park is to be commenced on March 22 next.—A competition is announced for the design of the Ludwig Richter monument at Dresden. Three premiums will be given, of an aggregate value of 225*l.*; the site of the monument is on the Brühl Terrace. Seven sculptors and architects, with the Mayor of Dresden, form the jury.—The authorities of the Bonn Provincial Museum have undertaken further excavations at the Roman castellum of Novesium, near Neuss. About 300 yards of the boundary-walls on the north

western side were uncovered, in addition to parts of the left portal. Traces were also found of three barracks and three other buildings, presumably officers' dwellings; also parts of a large building to the right of the *proletorium*, the purpose of which is not known.—We have to record the death of Colonel Carl von Cobhansen, Curator of Nassau Antiquities at Wiesbaden. Born in 1812, he served as an officer in the Prussian Army from 1833 to 1840, in which year he took over the direction of certain stone works at Mettlach. His archaeological activity commenced in 1850, with an examination of the ancient fortifications and graves of the Hunsrück. This was followed by a journey through Italy to study Medieval fortifications. At the order of Napoleon III. he made archaeological researches in the Rhine and Maas districts for that Emperor's "Life of Caesar." In 1874 he was called to the directorate of the Romano-German Museum at Mayence, and in 1885 to that of the German Museum at Nuremberg; he was latterly appointed an Imperial "Limes" Commissioner. In addition to writing a number of treatises on various archaeological matters, Von Cobhansen was the author of works on "Caesar's Rhine Bridges," "The Saalburg Castellum," "Rhensish Antiquities," and "The Roman Boundary Wall."

### MISCELLANEOUS.

THE LONDON BUILDING ACT AND THE TRIBUNAL OF APPEAL.—According to the *Journal* of the Royal Institute of British Architects, the Secretary of State for the Home Department has appointed Mr. J. H. Nicholson, one of the members of the Tribunal of Appeal constituted under Section 175 of the London Building Act, which comes into force on the 1st prox. The Council of the Royal Institute of British Architects have appointed Mr. Arthur Cates, and the Council of the Surveyors' Institution Mr. T. Chatfield Clarke.

LEAD PIPES AND WATER.—At a meeting of the Yorkshire Medical Officers of Health at Huddersfield, on the 13th inst., some communications were read on the action of water on lead pipes. According to the *Leeds Mercury*, Mr. Evans, of Bradford, who read the first paper, pointed out the chemical action of water upon lead service-pipes, and said that if lead were dropped into carefully-distilled water and left for a time, at the bottom would be found a white precipitate, which, on examination, was found to consist of oxide of lead and hydrate of lead, generally known as oxy-hydrate of lead. The solution of this in the water was a subsequent process. This oxy-hydrate of lead, he believed, was due to the presence of the oxygen in the water upon the lead pipe that might be exposed to its influence. But, it might be asked, "Where did the oxygen come from?" because the water was not decomposed. He had come to the conclusion that the oxygen was produced by being actually dissolved in the water itself, while it might also be due to the presence of oxidizing agents in the water itself, however carefully distilled. Dr. Whitelegg (West Riding County Council), who followed, said that he had been watching for the last two or three years, experimentally and otherwise, the action of a number of water-supplies upon lead, and the results differed in some cases from those that he had previously endeavored to ascertain from the accounts of earlier experimenters. In many of the experiments made erosion had been completely lost sight of. He agreed that the water they had most trouble with was the acid or moorland waters, and many peaty pools were the most active of all. The action, however, was by no means limited to acid or soft waters. The power of some waters could be removed by the addition of chalk, and of others by the addition of carbonate of soda; but these two would not act in all cases, and they had to be careful about dogmatizing on the matter. This question of erosion deserved more attention because there was no doubt that if water was left standing all night in a lead service-pipe, there was lead present in poisonous and dangerous quantities in the morning, so that the first flow of water ought to be always allowed to run to waste. He had come to the conclusion that there were many more public water supplies in the West Riding which acted upon lead than was at present suspected, and, as Medical Officers of Health, they ought not to assume that the water under their charge did not act upon lead, but see by experiments whether there was not lead in solution. He had, he said, mentioned two methods of preventing water acting upon lead; but there was a third, and that was by the treatment of filtration, though, to his mind, there was a tendency to assume that filtration would do too much. In some cases, he urged more co-operation amongst Medical Officers of Health in regard to this important question. We may add that this conference took place in the midst of a district of England which is largely supplied by water of what is known as "soft" quality, which is specially prone to act upon lead. The warning does not apply equally to all neighbourhoods. The action of the "hard" London water on lead pipes is so slight that it may be practically disregarded. But wherever "soft" water is the chief or sole supply the danger is no doubt a real and serious one.

THE WORKSHIPFUL COMPANY OF CARPENTERS.—The annual examination in practical sanitation took place at Carpenters' Hall on Friday and Satur-

day last week. The number of candidates presenting themselves exceeded that of all previous years, being upwards of forty. The Company again secured the services of Mr. F. C. Penrose, P.R.I.B.A., F.R.S., Professors Banister Fletcher, Henry Robinson, T. Roger Smith, Dr. Wynter Blyth, and Mr. Ernest Turner, to act as examiners. The list of successful candidates, with the questions set at the examinations, will be found in our advertisement columns.

BRIDGE BUILDING.—The second of three lectures on "Bridge Building," by Professor Goodman, of the Yorkshire College, was delivered on the 10th inst. in the Municipal Buildings, Leeds. In the first lecture the question of the foundations of bridges was dealt with, and it was pointed out that the essentially artistic structure—the suspension-bridge and the arch—depended much more for stability on their foundations than ordinary girder-bridges. In the second lecture, Professor Goodman showed that in all girder-bridges one part was subject to compression and the other to tension. In a suspension bridge the compression part of the structure was dispensed with, the earth being made to do duty for it, and was compressed between the piers. A series of experiments were given to show the different curve taken by suspension-bridge chains when differently loaded. That there was an alteration in the form of the chains for the purpose of the bridge was illustrated by running a model locomotive over a small suspension-bridge. This kind of thing, the lecturer pointed out, was quite inadmissible in a structure to be used for rail or road traffic. The various methods of stiffening suspension-bridges were then dealt with, and illustrated by models and lantern-slides. The lecturer endeavored to illustrate the various types of suspension-bridges were the Brooklyn Bridge over the East River at New York, the Clifton Bridge over the Severn, and the Pittsburg Bridge over the Alleghany River, and also the bridge over the Niagara Falls. The arch was explained to be an inverted suspension-bridge. The true arch the structure was intended to be entirely in compression, whilst in a suspension bridge the chains were entirely in tension. A flexible suspension-bridge altered its shape corresponding with the distribution of the load it carried; an arch, however, could not do this. Hence the shape of the arch must be made to correspond with the special distribution of the load it had to carry. By evenly loading an arch with heavy material added to its stability, and a load passing over was not felt so much. The lecturer then explained how arches are built, and gave reasons why Gothic arches are, generally speaking, stronger than Norman arches. He closed his lecture by exhibiting a series of slides of noted arches.

THE SANITARY INSTITUTE.—At an examination for Inspectors of Nuisances, held at Cardiff on December 14 and 15, the following nine candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Sanitary Inspectors:—James Burke, Cardiff; Fred Cox, Cardiff; Albert Githam, Cardiff; Albert Macey, Cardiff; William White Plackett, Cardiff; Herbert Stanley Price, Caerphilly; George Edwin Rogers, Newport; James Taylor, Cardiff; Walter H. Whitaker, Frome.

BRISTOL CLERKS OF WORKS AND BUILDERS' FOREMEN ASSOCIATION.—The members of this association held their second annual dinner on the 19th inst. at the Grand Hotel, Bristol. The Dean (Dr. Pigou) presided, and the company numbered about eighty. There were two vice-chairs, occupied by Mr. A. Scull and Mr. W. Woodrow. Mr. W. H. Cowlin proposed "The Bishop, Clergy, and Ministers of all Denominations," remarking that no better friend to builders existed in Bristol than the Dean. Since he had been there Dr. Pigou had created quite a revolution in the management of the old Cathedral, and they had had the pleasure of seeing the first part of that beautiful fabric assume something like the condition it ought to be in. The Dean, in reply, said the Dean and Chapter had had the happiness of feeling that they were keeping in employment for a considerable time a large number of skilled workmen in Bristol. A very large part of the important work that was being carried on in the Cathedral was executed beautifully, faithfully, and honestly by Bristol men. There was 10,000*l.* more work wanted there, and as they had started in earnest, they hoped to be able to finish it. Mr. Gawsey gave the toast of "The Architects," and on their behalf Mr. H. G. Pearson replied. Mr. J. Pike gave "The Master Builders." Mr. W. A. Cowlin replied. He was glad to hear they intended to start a library, and he believed he might promise on behalf of the builders their hearty support to the scheme. He hoped the Association would be used as a medium for finding places of work, seeing that a bad clerk of the works was as great an evil as a builder could have. The Association would accomplish a useful purpose if it set its face against scamping of work, because if it in the end to perform contracts honestly and well, Mr. E. T. Hatherley also acknowledged the toast. He said the Association was bound to do good; it was a link between the builders and their workmen, and he hoped it would make their relations thoroughly harmonious. Mr. J. Brown proposed the toast of "The Association." Mr. Woodrow, Chairman of the Association, responded. He re-







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# The Builder.

VOL. LXVII. No. 2758.

DECEMBER 29, 1894.

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### The Competitive Designs for the Paris Exhibition of 1900.



OF fewer than 112 sets of designs have been submitted in the competition for the new buildings to be erected for the great International Exhibition with which the French propose to celebrate,

in the year 1900, the commencement of the twentieth century. The stress of the competition has eliminated a large proportion of the 664 architects who applied for leave to compete, and a considerable number of designs have been put on one side as incomplete. The drawings are at present being exhibited in the upper galleries of the Palais de l'Industrie, and amongst the 112 a very large number are well worthy of careful consideration by the jury. Amongst so large a number of designs there are, of course, many to be found which, from lack of ability or of time, are hopelessly out of the running, but comparatively the proportion is smaller than one would expect in an English competition.

The site proposed for the Exhibition embraces not only that of the 1889 show in the Champ de Mars and the Trocadéro, but also an almost equal area in the Esplanade des Invalides, with the Palais de l'Industrie and the ground around it, thus extending from the Hôtel des Invalides to the Champs Elysées. The quays on either side of the Seine, between these locations, were also placed at the disposal of the competitors, who were also left free to retain or adapt such of the existing buildings as they might deem fit.

The Trocadéro building is universally retained, a few only of the competitors venturing even to modify its exterior. Very varied views have been taken by the competitors of the desirability of keeping the remaining buildings. The fact that the architects of the 1889 buildings are members of the jury might have been expected to predispose the competitors to a considerable retention of the old buildings, but it is worthy of notice that the majority of the

really able designs make a more or less clean sweep of the older structures, the Trocadéro excepted, as we have already noted.

There can be no question that for ensuring success to the Exhibition any cheeseparer economy in the retention of the old buildings will be fatal, even should the saving be as much as M. Formigé estimates, viz., thirty-two million francs. The only buildings of the 1889 Exhibition which we should care to see retained are the twin Palais des Arts, which are well designed and suitable for their purpose, whilst their comparative subordination would not interfere with a novel aspect being given to the new show by the erection of dominant structures possessing fresh interest. We are somewhat surprised to see that a large number of the competitors propose to retain the Palais de l'Industrie, although, indeed, several propose to dress it in new clothes by adding more or less of a new external skin. It will need more than decoration to make it serviceable, however, as the rain pours through the glass roof in all directions, much to the disgust of the exhibitors in the cycle show which now occupies the central area. The very galleries in which the competition drawings are on view are scarcely protected by awnings under all the glass. Very few of the designs which include any large retention of existing buildings escape from producing the impression that their authors kept the old work because they lacked either the time or the ability to design new.

The evil influence on the minds of the competitors of the financial success of the Eiffel Tower has been considerable in determining their projects. Few, comparatively, have ventured to suggest its demolition. Many have proposed addition, alteration, modification, or incorporation with new work, whilst others again have been spurred on to propose new sensational features which might make a specious bid for the francs of the *gobemouches*, but would not merely excite, as did the Eiffel, the amazement of all artists and men of taste, but bring upon Paris the derision of the civilised world, and for ever depose her from her artistic supremacy. Paris, in her Exhibition, may be allowed some freedom and some gaiety; she may be as *chic* as she pleases, but civilisation will draw the line at the buffoonery of the circus in the celebra-

tion of the triumphs of civilisation, of peace, and of labour at the close of the nineteenth century.

Thus most of the designs which are deserving of attention by the jury may be classed in three categories—the economical, the straightforward exhibition, and the sensational show—and it will be interesting to hear which of the three principles the jury will choose in determining their selection of a design.

As regards architectural treatment, in almost every case the designs of the last Exhibition buildings furnish the keynote. Some are more, some less, fantastic and rococo, but the general tone is maintained through all, and may be accepted as sufficiently suitable for a French exhibition. The drawings are almost universally excellently prepared and brilliantly coloured; some have many sheets and give details, others have few and give only general dispositions.

In the design under motto "La Presse Française" the Eiffel Tower and the Galerie des Machines are retained, as is also the Palais de l'Industrie, with some slight modifications, and a new series of buildings surrounds the remainder of the Champ de Mars. The novelty of the design is a "Mundusorama" on a platform across the Seine between the Palais de l'Industrie and the Place des Invalides. In this "Mundusorama" the visitor will travel by a light railway through a panorama of the world, 1,800 metres long, round the world in two hours.

M. Louis Meissonnier proposes to cover the Seine entirely between the limits of the extent of the quays comprised in the scheme of the site. He proposes to remove the Eiffel Tower, but to retain the twin Palais des Arts and the Palais de l'Industrie. A further sensation is the introduction of immense domes to form lanterns at night.

The design by MM. Bernard and Cousin has a plan of suitable arrangement. The principal buildings are placed on the Champ de Mars, where of the 1889 Exhibition are retained the Eiffel Tower, the two Palais des Arts, and the Galerie des Machines. Between these are the new buildings, an immense glazed dome, octagonal in form, with avenues radiating from the centres of the sides and a series of five concentric galleries. The central domed area is dedicated to "Electricity," and the dome is constructed in a series of niches or

coffers, each with its powerful lamp and reflector. This, of course, is for "sensation," but does not prevent the arrangement of the galleries around, dedicated to "Various Industries," from being one of the best that can be devised for exhibition purposes. In this design the Esplanade des Invalides is devoted to Colonial exhibits arranged on either side of an avenue, with the Hôtel des Invalides at the end. The designs of the exterior follow the key of the 1889 Exhibition in style, and are shown by some well-coloured drawings.

M. Blavette retains but re-dresses the Palais de l'Industrie and the Palais des Arts, removes the Eiffel Tower, and covers the greater part of the Champ de Mars with a series of connected galleries. The Esplanade des Invalides is occupied by a large galleried hall for furniture and decoration, and an elliptical building for scientific and literary material, which, together, are balanced on the other side of the Seine by the Palais de l'Industrie and a second elliptical building. This design is essentially one for an exhibition, and is entirely free from all sensational attractions.

The design hung next, that by M. Alfred Leclerc, is a complete antithesis. Sensation at any cost has been the author's guiding principle. The Eiffel Tower is eclipsed by two enormous elephants, with lofty Indian pagodas on their backs and their trunks lifted in arch-form, in which a tramway is to run. Then there is an enormous triumphal arch, the top of which is about two-thirds the height of the Eiffel Tower.

MM. Larche and Nachon show a completely new arrangement, retaining only the Palais de l'Industrie, with some modifications. A circular-domed building occupies the centre of the Champ de Mars, and a series of galleries run round the sides. A new building for works of art is placed on the Esplanade des Invalides, the old Palais de l'Industrie being devoted to the material of science and art. For sensation, there is a triumphal arch, symbolising and dedicated to electricity, on a new bridge of communication with the Invalides. This is but a tribute to the show element in a design which is, on the whole, businesslike.

The design by M. Gaston de Montgolfier includes some features evidently intended to mark the engineering skill of the nineteenth century. The achievement of the Eiffel Tower, 300 metres high, is to be paralleled by girders 300 metres in span over a large hall, which the author makes part of his plan and places at the rear of the Champ de Mars. These immense span-girders are merely *jours de force*, as the length of the hall is but a fraction of its span, and the roofing might be far more easily constructed. It is scarcely worth while to make girders of this length merely to show that it can be done. A further engineering exploit proposed is the construction of an elevated railway at the level of the first platform of the Eiffel Tower, which is retained. A lake is proposed in the Trocadéro Garden, whereon a little mild boating in Venetian gondolas may be enjoyed by holiday-makers. Beyond these somewhat clap-trap attractions the plan is a fair one, the bulk of the Exhibition being accommodated in a large block of buildings on the Champ de Mars; having a Salle des Conférences in front towards the Seine and galleries running the length of the Champ de Mars. Smaller isolated buildings are proposed on the Esplanade des Invalides, whilst the Palais de l'Industrie is retained.

M. Amadée Sebillot's design may be mentioned as an example of the extravagant notions which rather than skilful design appear to some of the competitors as legitimate attraction for a World's Fair. This gentleman out-Herods the Eiffel by suggesting beneath it a shaft or well, with galleries at intervals, by which visitors may explore, to a limited extent, the crust of the earth, and as the tower is 300 metres high, the well is proposed to be 3,000 metres deep. A flying ship is also suggested, whilst the

ascent of the various stages of the Eiffel is to be made by captive balloons and aeroplanes.

After such a stupendous effort of the imagination, the author's genius could not, of course, be expected to conceive a new plan for the Exhibition buildings, so the old ones are retained.

M. Marcellin is another competitor whose ideas have evidently been directed by the Chicago show towards aquatic fêtes and gondolas, as he proposes to convert the greater part of the Champ de Mars, as well as the Trocadéro Gardens, into a big lake with the Eiffel standing in the middle. The old buildings are, of course, made to do duty again, the novelty being afforded by the water show. Captain Boyton would doubtless be only too pleased to assist this gentleman.

M. Salleyquier's fancy runs in the direction of big bridges, for he proposes one of 14 hectares (about 35 acres), and as an alternative another of 9 hectares, spanning from the Champ de Mars to the Trocadéro, and bearing exhibition buildings.

Following the drawings in the order in which they are hung it is refreshing, after noting the eccentricities we have mentioned, to examine so admirable a design as that of M. Esquié. In general disposition this is one of the best plans exhibited. A clean sweep is made of all the old buildings except the Trocadéro, the Champ de Mars is almost entirely covered with an immense glass palace, the centre of which rises in hypostyle fashion with three large glass domes of a somewhat peculiar form based upon a four centred arch, suggesting a reminiscence of the great trusses of the old Galerie des Machines. This erection is intended for the reception of machinery and manufactures, special emphasis being given at the front portion of the building to the palace of electricity, which is marked by a further dome in the centre of the principal façade, due effect to which is given by the setting back of the buildings from the Seine, the space between which and the entrance is intended to be occupied by gardens and fountains. The details of this main building are rococo to the last degree and in some instances coarse in scale. On the Esplanade des Invalides the author proposes a grand Palais des Beaux-Arts, which is treated with more restraint and dignity, as befits its purpose. The portion of the site towards the Champs Elysées, now partly occupied by the Palais de l'Industrie, is devoted to a group of small pavilions allotted to Colonial exhibitions, whilst on the left bank of the Seine are to be found the buildings devoted to food and agriculture, and on the right bank those for foreign countries.

Another good design is that by MM. Walwein and Lefebvre. These gentlemen also propose a huge glass palace on the Champ de Mars for the main exhibition. This is arranged on what we may term the radiating principle; a central avenue has on either side two semi-circular halls, concentric with which are three galleries on either side. The remainder of the plan is made up of enclosing long galleries back and front, which stretch across the whole width of the Champ de Mars, and in front two flanking galleries project on either side. In detail this is, architecturally, one of the best designs exhibited, and the approach to this main building, with the projecting wings on either side, and the entrance marked by a well-designed façade and dome is particularly pleasing. An alternative design for the dome over the central entrance, shown to a larger scale, is even better than the original, and is one of the best pieces of architectural design in the whole collection. The site of the Eiffel Tower is left unappropriated, so that the white elephant may be either retained or removed, as financial considerations may determine. In this design the Palais de l'Industrie is retained, whilst the Esplanade des Invalides is devoted to minor buildings.

A remarkable *penchant* for domes is one

of the noticeable characteristics amongst the competitors as a whole, and a striking instance of this is the design of M. André, who proposes an immense circular dome, some 850 ft. in diameter, as the central feature in his building on the Champ de Mars. Surrounding this on three sides, but distinct from it, are rectangular galleries, and on the fourth side, facing the Seine, the grand entrance is formed by an open semi-dome, with nine tunnel-like galleries radiating from it. These look better on plan than in the perspective, though even on plan their *raison d'être* is somewhat diminished by the fact that six of the nine lead nowhere. On the Esplanade des Invalides this competitor has a group of galleries with two smaller domes. The Palais de l'Industrie is retained.

The design of M. Hermant also revels in domes, and is chiefly remarkable for a finely-designed Salle des Fêtes, with a large dome and carried on a bridge over the Seine. A great glass palace on the Champ de Mars incorporates the Galerie des Machines, and has a central dome and two smaller ones. A large glass Palais des Beaux-Arts occupies the Esplanade des Invalides, whilst the Eiffel Tower and the Palais de l'Industrie are retained.

MM. Bontron and Schoettkopf are amongst those competitors who have endeavoured to improve the Eiffel Tower. As the attempt in this case consists of a glorification with rococo ornament, an organ on the second stage, bells above, and a clock above that again, there is little fear that the jury will be so lacking in taste as to permit of the idea becoming an actuality.

M. Baudot has relied on cement as a means of reducing cost, but in producing a design which he considers especially suited to the material has evolved some very ugly forms. In the centre of the Champ de Mars he proposes a lofty domed structure of peculiar shape intended as a Salle des Fêtes, and decorated in bizarre fashion with coloured glass, faience and electric light. A clear space is arranged around this, and glass galleries follow somewhat the disposition of the 1889 buildings. The Palais de l'Industrie is to be retained.

The design of M. Paul Bonnier has a good plan, and makes a clean sweep of the old buildings except the Trocadéro. On the Champ de Mars an immense railway station roof covers the Central Machine Gallery, and in galleries on either side are located Manufactures. Projecting wings from the main block flank the open space towards the Seine, and an ornamental lake takes the place of the Eiffel Tower. A series of colonnades is excellently disposed in the Trocadéro garden, leading up with good effect on the rising ground to the Trocadéro. The author's careful attention to scenic effect is further exemplified by the treatment of the further part of the site. Entering from the Champs Elysées a grand building, intended for fine arts, with two projecting wings and an immense circular arched opening frames the vista and serves as an approach to the Esplanade des Invalides, at the further end of which is the Salle des Fêtes, whilst at the side are domed galleries for the materials and products of the arts and sciences. On the right bank of the Seine are located the buildings for agriculture, and on the left those for foreign nations, horticulture, and food. The architectural detail is not extravagant, but sufficiently gay in character.

M. Formigé not unreasonably advocates the retention of the existing structures, even the Eiffel Tower, although he a little disingenuously omits this last from his perspective. He proposes to continue the twin Palais des Arts with a circular sweep to a new Salle des Fêtes, in front of and masking the Galerie des Machines. The glorification of electricity is to be effected by a Palais erected on a bridge leading from the Champs Elysées to the Esplanade des Invalides, on which are a range of new buildings.

M. Chancel's design is one of the



"incroyables." The Eiffel is to be demolished to the first platform, and dressed up in new clothes, with a great ball on the top, representing the celestial globe, and grand night effects are proposed from this Palais de Feu. Another sensation is an enormous winding "chemin de fer aerien," arranged dome-fashion on a square-arched base spanning the Seine, between the Champ de Mars and the Trocadero Garden.

MM. Brunnarius and Pellerin suggest another sensation in the form of hanging gardens, leading from the first platform of the Eiffel Tower to the Trocadero.

MM. Bauer and Boizot have kept all the old buildings, and have taken considerable pains to disguise, as far as possible, the old work, and if, for motives of economy, the retention of the former structures be taken as a starting-point, from that starting-point these gentlemen may be regarded as being more successful than any other competitors. A new central block in the Champ de Mars is their most important new building. Three ideas for altering the Palais de l'Industrie are shown to fit for the new main entrance of the Exhibition, and from this a new boulevard is cut straight through to about the centre of the Champ de Mars.

M. Ballu is another competitor who makes heroic attempts to retain, with modifications, the older structures, even the Eiffel Tower being kept and dressed up in new clothes. On the Champ de Mars, and between the Palais des Arts and the Galerie des Machines, the chief novelty is introduced in the form of an immense square-domed structure, half the height of the Eiffel Tower, with galleries around. The Esplanade des Invalides receives a large glass palace, and the Champs Elysees has the old Palais de l'Industrie modified, and with the addition of a semi-circular Salle des Fêtes.

The design of M. Geleron need only be mentioned as a singular instance of perversity, inasmuch as he covers the Seine entirely within the limits of the Exhibition, and transforms the whole of the Champ de Mars and the Trocadero Garden into a lake, save for the old buildings, which are retained.

A good plan, but accompanied by insufficient drawings to show details of the design, is submitted by M. Sortais, in which the Eiffel Tower and the Palais de l'Industrie are retained but modified.

M. Girault sends a design which would make a charming out-door lounge in fine weather for those who did not wish to see the things exhibited. It is, indeed, rather a study in formal gardening—the Champ de Mars, for instance, being laid out as a central garden, with six detached pavilions around, and a new entrance to the Galerie des Machines, which is retained. The Eiffel Tower is also kept, and the tower part enclosed to form a grand entrance-porch to the garden. The Palais de l'Industrie is preserved, but with a large domed building added at the rear for a "Musée rétrospectif des Arts." The Esplanade des Invalides is treated with smaller buildings on each side forming an avenue to the Invalides.

The design of M. Mewes is one of those which proposes the entire demolition of the existing buildings except the Trocadero. Like the last, the Esplanade des Invalides is treated simply as an approach to the Invalides. The Champs Elysees is arranged as a circular open space with a semi-circular building for Fine Arts. The chief exhibition building is an immense structure on the Champ de Mars with a semi-circular approach. This design has much to recommend it, but is not quite in the front rank.

MM. Thomas and de Tavernier keep the Eiffel Tower, but re-dress it and construct a Salle des Fêtes beneath it. They re-clothe the Palais des Arts in extravagant detail, and put a new skin around the Palais de l'Industrie. A glass palace occupies the Esplanade des Invalides, but the principal attraction is a bridge over the Seine between the Trocadero and the Eiffel Tower of wonderful design. Indeed, the whole scheme is characterised by extravagant and

bizarre detail, and suggests that the authors had sought to stimulate their invention by a course of study of the "Arabian Nights."

The design of M. Defrasse is moderate in conception and workable in plan. All the old buildings are cleared away except the Galerie des Machines, which, however, is masked by an assemblage of somewhat low glass sheds over the Champ de Mars, with a good façade towards the Trocadero. The grand entrance is placed at the Champs Elysees, and an avenue of minor buildings forms an avenue of which the Invalides terminates the vista.

A fair plan, though not quite one of the best, with the main exhibition covering the Champ de Mars, is submitted by M. Farcy. The Palais de l'Industrie is kept and devoted to the Fine Arts.

M. Pille is one of those afflicted with Eiffelism, and makes the tower the centre of his composition, dressing it up in an extravagant fashion.

M. Bossis also is in the same category. He takes off the top of the Eiffel, puts a great globe upon it, and adorns the lower part.

MM. Saladin and de Sevelingen keep the Eiffel Tower, and arrange a series of galleries around and beneath it. A large palace with central square dome is placed at the rear of the Champ de Mars. The Champs Elysees and Esplanade des Invalides are here again treated in landscape gardening fashion, with narrow long buildings well disposed for scenic effect.

M. Debrie submits another of the mad-cap schemes, the chief feature of which is a subterranean hall of an area of 138,700 square metres.

M. Courtois-Suffit affords another instance of frantic striving after sensation. A grand bridge over the Seine from the Champs Elysees to the Esplanade des Invalides bears a Palais des Fêtes, which at night is to be lighted up by Bengal fires, electric light, and so forth; circular colonnades are arranged with good scenic effect at each end. A group of buildings surrounds the Champ de Mars, which is laid out as a garden, whilst the Galerie des Machines is preserved, and the Eiffel is cut down and surmounted by a globe. A horrible triumphal arch in iron forms the principal entrance from the Place de la Concorde.

M. Robida makes a suggestion which might be incorporated in the selected design and would form an attractive as well as educational element of the Exhibition. He proposes a series of illustrations of old Paris, reproductions of bit-bits of Medieval France, and a representation of the architectural wonders of Asia. These are well worked out, and amply justify the idea of the author.

MM. Isabey, Toché, and Valentin Smith propose to keep the Eiffel Tower, and, like another competitor already alluded to, show hanging-gardens, extending from the first platform of the tower to the Trocadero Garden. On the Champ de Mars a large glass palace is placed with a Salle des Fêtes in the centre and galleries around. The Galerie des Machines is kept and slightly ornamented. On the Esplanade des Invalides is a palace for the glorification of electricity, and leading to it smaller galleries on each side.

The chief feature of M. Marcel's design is the alteration of the Eiffel tower to a temple of light surmounted by a gigantic figure of France, obviously inspired by the New York statue of Liberty. He keeps the Palais de l'Industrie but modifies it and gives it a new glass roof and dome. The Palais des Arts are also retained but modified and at the rear of the Champ de Mars elliptical-planned galleries are shown. Smaller buildings occupy the Esplanade des Invalides.

Thus it may be seen from our description of the most prominent designs that the competitors may be, almost without exception, classed in one of three groups—first, those who propose the complete removal of the old buildings save the Trocadero, and in some instances, the Palais de l'Industrie;

second, the economists, who propose to retain the former structures, modifying and masking them to a greater or lesser extent; and third, the sensationalists, who by more or less outrageous devices seek to obtain for the Exhibition a meretricious notoriety and attraction. The Eiffel Tower is the *l'ite* *noire* of the problem, and we think those are wisest who propose its entire demolition, in spite of the great cost, estimated, though it be, by M. Formigé at five and a half million francs including compensation to the concessionaires.

Very great interest is being taken by the Parisians in the exhibition of competition designs, many of the more attractive drawings being crowded round with visitors four or five deep, and we believe we are within the mark in estimating the number present at one time at between three and four thousand people.

We are pleased to note that public opinion seems rather to incline towards the first class into which we have divided competitors, and also that a very general abhorrence of the Eiffel Tower is manifested.

There are several designs which, if carried out, would do credit to Paris and to France, and many others have good points, some of which it is not impossible may be incorporated by the collaboration of their authors with the successful competitor.

#### SOME OLD HOUSES AND FURNITURE.

THE above rather comprehensive heading is suggested by the title of the book of illustrations of old work by Mr. W. B. Sanders.

which is neither a book on half-timber houses nor a book on ancient furniture, but a combination of illustrations of both classes of work. There is no particular reason for classifying these two branches of work together except that both the houses and the furniture are woodwork—at least as far as the most characteristic portion of the house constructions is concerned. The interest of the houses consists mainly in the manner in which plain pieces of timber are used in a picturesque form of construction, while the interest of the furniture consists mainly in its carved work and other decoration. Of the thirty plates in the book, however, only four illustrate houses, which is not sufficient to make a book of; we may take the title as an excuse for publishing these four drawings along with the rest of the set; and no doubt they add to the interest of the collection.

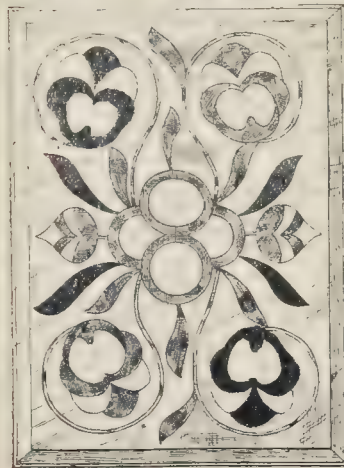
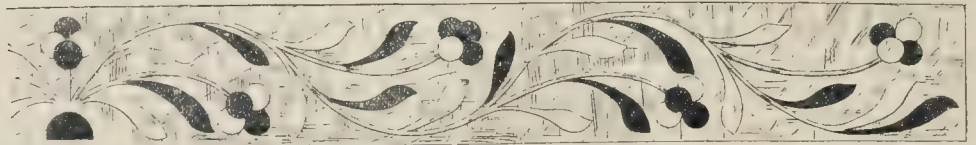
The four houses illustrated are all from Kent, and are all good examples of the pleasing effect which may be produced by the exhibition of simple and unostentatious timber construction. The "Old Cottages at Leeds" (a village in Kent) are an excellent example of this; there is no pattern-making in the timber-work; above and below it is simply a series of uprights, interrupted only where the windows intervene. The upper story is corbelled out to get more room above, the ends of the floor-timbers being run through and shown outside, and thus producing a slightly decorative effect in a perfectly natural manner. From an architectural point of view it may be questioned whether the house would not have looked better if the ground story had been of stone; the basement looks rather weak as it is. But the half-timber construction was the cheapest and was therefore adopted, just as the picturesque over-sailing of the upper story was adopted to obtain larger rooms above. In the case of houses like these there can probably be no greater mistake than to suppose that the people who built them wanted them to look picturesque, or had any such idea in their minds. They were simply making the most economical use

\* "Half-timbered Houses and Carved Oak Furniture of the Sixteenth and Seventeenth Centuries." By William Bliss Sanders. With thirty illustrations photographed from the original sketches of the author. London, Bernard Quaritch, 1894.





*Old House at Leeds, Kent.*



SOME EXAMPLES:  
OF OLD INLAY:





of their materials and of the ground they had to build on. In speaking of the old house at Pluckley, illustrated in Plate I., the author observes that the roof "is left plain to act as a counterfoil to the walls, which are chequered with timber work." We do not believe the men who built that house gave a thought to anything of the kind. They left the roof plain because covering it with plain tiles was the simplest way of doing it. This and many other such erections are picturesque, there is no doubt, but the picturesque element comes much more out of our own perceptions than out of any intention on the part of the original builders. And if they had deliberately aimed at picturesque contrast, they would very likely have missed their mark, and the buildings would not have the charm for us which they now have.

The house at Leeds, illustrated in Plate II. (of which, by the permission of the author, we give a reduced reproduction), shows a little more of conscious intention of producing a good architectural effect; the architect of it appreciated the value of a strongly-marked projecting cornice, at all events, and to give security to this both in appearance and in reality the upper portions of the uprights are formed as corbels. In other portions of this front there are touches of intentional architectural effect, though the treatment is simple enough on the whole. We are by no means implying that there may not be a considerable amount of successful calculated architectural effect realised in half-timber construction; we only deny that the simpler cottage buildings of this class, which are often among the most pleasing in a pictorial sense, were contrived with any such intention.


The illustrations of carved furniture, as already observed, come under a different heading, and are mostly distinctly ornamental work intended as such, though there are points of interest in the construction, as in the child's high chair shown in Plate XVIII., where the upper portion is no wider than is necessary to give room for a child to sit, but the legs are spread considerably so as to give a larger base and prevent any chance of the chair toppling over with a restless little occupant. This piece of pure common sense in design is what one would think ought to occur to everyone who made a child's high chair for sitting at table, yet where do we ever come across an example of it in the modern object of the same class? The period of work which is mostly illustrated in these drawings is the sixteenth and seventeenth centuries, and the author rightly calls attention to the interest which attaches to English furniture of about this time from its mingling of Renaissance forms with a certain amount of Gothic reminiscence. It might also be added that one cannot but be struck with the comparative clumsiness and coarseness of much of the ornament as compared with Italian work of the same period. Many people, including we fear Mr. Sanders, will think this a very unsympathetic remark to make, but we see no reason why admiration for old work should be cultivated at the expense of truth of critical perception; and the truth is that though there is a good deal of richness of effect in the work illustrated here, and that moreover it has the merit, for the most part, of being specially and obviously suitable for execution in wood, the details are very often coarse and commonplace, and look too much like Classic detail executed by people who only half understood it, or only sufficiently to make a somewhat rude reproduction of it. Moreover, the lines of what we may call the limbs of the furniture, the legs especially, are often somewhat stiff in form and elephantine in character. These very qualities no doubt give certain special character and interest to the work, but they do not alter the fact that for the most part it cannot be called refined work, either in design or execution. The panels of inlay work, of which we give a reduced reproduction, are an exception to this rule, and are exceedingly pleasing bits of design, besides being interesting as illustrating a method of ornament which until

recent days has been much less used in England than in Italy. The long upper panel, and the oblong one on the right, are from an oak cabinet in a private house at St. Albans; the two other panels are from the tester of an oak bedstead in the possession of the author of the book. The size of the originals is not stated, nor is there any scale on the drawing.

Mr. Sanders refers, in the course of his remarks on the examples, to the question whether the "court cupboard" and the "livery cupboard" of the period in question were different names for the same article, or were distinct pieces of furniture. We should suppose that every probability was in favour of the latter conclusion, as different names are not generally given for no reason. The author states that he has made some investigation into the subject, and certainly considers that they were originally different articles for different objects, though they may in time have come to resemble each other a good deal. The distinction which he gives as the most probable and important is that the livery cupboard was intended to hold food, and was made therefore so as to ensure ventilation, while the court cupboard was intended for the safe keeping of glass and plate, and was therefore made to shut close. He supposes the livery cupboard to have been in its earliest form open, without doors, and in its later forms often made with pierced or open-railed doors; and this supposition would give a practical meaning to the design of the interesting example on Plate XV., of an oak cupboard with its doors filled in with open balusters. An illustration given in Plate XVII. shows, we are told, a "livery-cupboard" placed on the top of a "court-cupboard." This example (one of the best in the book in the artistic sense), is in a hotel at Tunbridge Wells, and it was long supposed that the whole was one piece of furniture. An examination, however, showed that they were entirely separate constructions. Some of the quotations from old deeds, which are cited by the author, appear to support his opinion as to the real function of the livery-cupboard.

We have only to add to these remarks that the drawings are admirable throughout, and the letterpress contains a great deal of information and suggestion in regard to the archaeological side of the subject.

#### NOTES.

 R. J. SIX, of Amsterdam, has recently published ("Jahrbuch d. K. D. Arch. Instituts, 1894," &c.), a hypothetical restoration of the central group of the east pediment of the Parthenon, which deserves the attention of English archaeologists. The new restoration is based, as all restorations must be, on "Sauer's marks," but it differs from that proposed by Dr. Sauer himself. Dr. Sauer, it will be remembered, places no central figure in the apex of the pedimental triangle; he seats Zeus to the one side, balanced on the other by the standing, new-born Athene. This arrangement was never from the artistic point of view pleasing, for the eye has been trained by long tradition to expect a central figure, or at least some central object—like the olive-tree of the west pediment. Dr. Six places the seated Zeus exactly in the centre, and allows the figure of the standing Athene to be balanced by that of Hephaistos behind the throne of Zeus. Sauer's marks oblige the figure of Athene to be placed somewhat further from Zeus than is that of Hephaistos, and the gap so formed Dr. Six very skillfully fills with the figure of Nike floating toward Athene. It will be seen that he very closely follows the composition of the Madrid puteal. The restoration is an interesting one, for it has been made by a sculptor from actual living models, draped and posed in accordance with the Madrid puteal.

THE same number of the "Jahrbuch" which is referred to above contains the account of a paper read before the Archaeological Society of Berlin by Herr Winnefeld, on some particulars in the plan of Hadrian's villa. The only ancient account of the arrangements of the villa ("Spartian Hadrian," cap. 26) states that certain portions of the grounds were called after the various noted places and buildings they were intended to imitate—e.g., there was a Lyceum, an Academy, a Prytaneum, Canopus Temple, and even an Under-world. In only one instance, that of Canopus, has this statement been borne out by excavations. In one, and one portion only, of the villa grounds, a quantity of statues in Egyptian style made of blackish marble have come to light, and here the Canopus must have been. This portion of the villa cannot have been built before A.D. 134, the year of Hadrian's return from Egypt, it is, therefore, one of the latest parts of the whole building. To the discussion of its plan, given by Dr. Winnefeld, and the question how far it was a close imitation, how far merely a vague reminiscence of the actual Egyptian Canopus, the paper is devoted.

THE Roman villa at Darent, which was described in our last, still continues to reveal features of interest, and the excavators are opening out its enormous size day by day. It has been necessary to enlarge the area of the operations from 300 ft. square to 450 ft. square, and the lines of walls crossing and recrossing one another now occupy the larger portion of this area. The bath already mentioned has now been cleared entirely, and it proves to have been 38 ft. long by 9 ft. 10 in. wide, but at some later period of the occupation it was divided by a cross wall into two divisions. It is 4 ft. deep, and the walls are lined with a mortar coating formed of pounded brick. To the west, an elaborate range of chambers has been laid bare, of different axis to those to the east, and a third range to the south is now being uncovered, having the inclined axis. The principal find, however, is to the east, where an apartment, 10 ft. 6 in. by 9 ft., has been just discovered. It has a pavement all but perfect, and still supported on large flat bricks carried by piers formed of flue-tiles used for this purpose, thus forming a hypocaust which, in fact, is all but perfect, but the aperture for the introduction of fuel to heat it has yet to be excavated. Its position is marked by portions of its arch, which is visible. This makes the sixth apartment heated by a hypocaust that has now been laid open. A large number of roofing-tiles are being found, and also of the half-round ridge-tiles, which covered their flanges. Most of the chambers that have been cleared retain the plastering of the walls, and in several instances the coloured decoration, which appears to have been common to all the best rooms, can still be traced more or less distinctly. For the first time in England, a pane of window-glass has been found. It is broken, but sufficient remains to show that its size was 11½ in. by 8½ in. The excavations are attracting many visitors, who watch the proceedings with considerable interest. The best of the articles that have been found are now displayed in a temporary museum that has been opened within the enclosure.

ONE of the "accidents" recorded in the recent gale was that, as we read in the *Times*, during the height of the gale on Saturday the wind got under the galvanised roof of the grand stand at the Invicta Football Ground at Plumstead, lifted the roof (two tons weight) and blew it over a wall on to some adjacent ground where some boys were playing at football; it fell on one of the boys and broke both his legs. It also brought down several tons of bricks from the wall. Now that is a kind of thing which we do not call an "accident," because it arises



from ignorance or carelessness in construction. Every one who puts up such a roof, and every District Surveyor (if there was one concerned in this case) who passes it, ought to know that wind may exert an immense lifting-power under an open roof of that kind, and the roof ought to be tied down so as to resist the lifting force of wind, not merely secured against lateral movement. The parents or guardians of the unfortunate boy who was so badly hurt would do well to bring an action for compensation against the owners of the stand in question. They, of course, are not directly to blame, but their builder or architect: but it is they who must probably be legally responsible, and a successful action resulting in pretty heavy damages would be a useful practical lesson to those who put up open shed roofs of any kind, which are intended to be permanent, to have them properly constructed and secure against the effect of wind getting beneath them.

THE stone industry of the United States has suffered a terrible reverse. According to the official "Mineral Resources" of that country for 1893, distribution copies of which have but recently arrived in London, the value of the stone raised in that year was 30·5 per cent. less than in 1892. The following statistics give some idea of the extent to which each branch of the industry was affected:—

	1892.		1893.
	dols.		dols.
Granite ..	12,627,000	.....	8,808,934
Sandstone ..	8,265,500	.....	5,195,151
Limestone ..	18,392,000	.....	13,047,223
Marble .....	3,705,000	.....	2,411,092
Slate .....	4,117,125	.....	2,523,173
Bluestone ..	1,600,000	.....	1,000,000
	48,706,625		33,888,573

For the individual kinds of stone, therefore, the percentage decreases were as follow:—granite, 30·1; sandstone, 37·1; limestone, 24·3; marble, 34·9; slate, 38·7; and bluestone, 37·5. The officials attribute this falling off to the universal financial depression that prevailed in the United States during a part of the year 1893. In the Southern States even public improvements, such as paving in cities, &c., were curtailed, or entirely suspended, because of the impossibility of selling bonds for the purpose of securing cash for the maintenance of such work. Thus, for instance, the granite block-paving industry of the South suffered to an enormous extent. Nor does there seem much chance of improvement, for we observe that "it is very evident that the year 1894 will run behind even still more than 1893, unless there is a revival of the general conditions of trade greater than it is reasonable to expect." A radical change is proposed to be made in the method of selling stone in the country; the prevailing sentiment amongst quarrymasters seems to favour selling it by weight instead of by the cubic foot, cord, perch, or yard, as at present. This may be all very well for the quarrymasters, but we doubt if American architects regard the proposal in the same light. The objections urged against the present system is that there is no uniform standard of measurement, that it is too cumbersome and allows too many leaks. Precisely the same might be said with regard to the English method of selling stone, but no one in their senses would buy an absorbent stone by weight in this country; we should expect it to arrive from the quarry thoroughly saturated, so as to make it weigh as heavy as possible. Then, again, the question of specific gravity, which in some cases makes no difference in point of quality or durability, would have to be seriously taken into account in purchasing building stone, even as it should now be considered in reference to road-metal, and for the same reasons. The article on stone in the "United States Mineral Resources" is, as usual, very full of interesting matter in addition to the above particulars, but we rather take exception to part of it. At the end is a compre-

hensive account of some of the foreign stone exhibits at the Chicago Exhibition, which is made a peg whereon to hang certain observations in regard to the stone industry of Great Britain. This portion is ostensibly supplied to the U.S. Geological Survey by a Swedish geologist; but it might have been stated that the pith of the information furnished originally appeared in our columns, and that many of the investigations made by him were in some measure due to assistance received from us. The compilers of the "Mineral Resources" alluded to, being left in the hands of this authority on granite, have fallen into the ridiculous error of imagining that the only building stone of any importance in the United Kingdom is granite—at least, in what purports to be a general account of British building stones, no other than granite is mentioned. Again, statistics of British stone trade given are practically copied from the official returns, without acknowledgment, and in the most barefaced manner.

THE annual Report to the Willesden Local Board by their Engineer and Surveyor, Mr. O. Claude Robson, is, as usual, a model of clearness and precision, and gives a great deal of information, as the results of experience in regard to the carrying out of various classes of public work, which may be of use to other public bodies as well as that to which the Report is presented. The Report first deals with the subject of roads. Wood-paving is recommended as much more economical in the matter of repairs than macadam, more especially for the repair of the strips adjoining the tramways in roads where these have been laid. The experience of using Guernsey and Leicestershire granite on similar sections of road has resulted in favour of the latter, both for economy in price and punctuality in delivery. A settlement has been arrived at between the London and North-Western Railway Company and the Board with regard to the repair of the roadways to bridges and approaches hitherto repaired by the company under the Railway Clauses Consolidation Act, 1845. The Board is to repair the roadways for the sum of 300*l.* per annum, and the railway company to contribute 1,000*l.* towards the paving and curbing of the pathways, subject to the Board freeing them from all future liabilities with regard to these repairs. The agreement, so far as it relates to the annual repairs, will extend for five years only, as the cost of maintenance will increase as the district further develops. In regard to the planting of trees by the side of public roads, which has been largely carried out, the distance of planting has been increased to 50 ft., instead of 25 ft. to 30 ft. as hitherto, as it was found the traffic was too much obstructed by the closer planting. The trees have been mostly planes, and only about 2 per cent. have failed to thrive. It is noted that the planting, however it adds to the agreeable appearance of the roads, has its drawbacks both in regard to obstruction of light from the street-lamps, obstruction to pathway traffic, and injury to the pathways by the growth of roots. It is therefore recommended that in future the planting should be confined to roads with wide footpaths and where the houses are set considerably back from the road. The necessity of providing better channels in many roads is touched upon, and a 12-in. by 6-in. curb on a 6-in. bed of concrete is recommended in place of the granite setts hitherto provided, as tending to ensure a cleaner and more uniform channel. In regard to sewers, it is mentioned that periodical flushing, once a week, has been kept up with very good results, the flushing being mostly done by flushing-vans. Where the sewers were under fields or private property, a travelling meter with hose has been used, and under other circumstances flushing has been obtained by sluices in the manholes, shut down till a sufficient head of water has been obtained. In regard

to the ventilation of sewers, the columns known as "sewer-gas destructors," and the ventilators provided with disinfecting media, have both been abandoned as useless. Instead of these, 6-in. iron pipes have been affixed to buildings or independently erected by the road-side to act as ventilators to the sewers in place of the open grids, and in the Surveyor's opinion this simple method has proved most efficacious in abating the nuisance arising from the generation of sewer-gases and their discharge into the open air. This system has been adopted for the past four years in the Willesden district, and each year sanction is obtained from owners and occupiers of houses to affix additional upcast shafts to houses, with the result that the number of complaints as to offensive ventilation is annually decreasing.

THE fire which almost entirely destroyed the infantry barracks at Winchester last week was fortunately prevented from extending to the adjacent hall, which is a relic of the ancient Castle, or Domus Regis. The main building forms the incomplete palace designed by Wren for Charles II., whereof the first stone was laid—though not, as some say, by the King—on March 23, 1683. In vol. i. of Milner's "Winchester," 1798-1801, is a large plate, engraved by J. Pass and drawn by J. Cave, "ex autographo, C. Wren, Equit." Some doubt has been cast upon the authenticity of the view, which Milner says is from the drawing of Wren. It shows a three-storied block, with a lofty drum and dome, and a central hexastyle portico carrying an angle-pediment. Each of the two wings has a smaller tower and cupola at its middle point (over a chapel), and a quarter-circle colonnade at its outer end. In front of the group lies a spacious open court flanked by two blocks of two stories and an attic floor, and in front again of these, beyond the gates, are two more blocks (set lengthwise) of three stories and an attic floor. The whole plan was meant to include a grand approach to the cathedral's west front, and a park to the south and west. The Castle, whose foundation is ascribed to William the Conqueror, lay at the south-western angle of the city-wall, and within the castle-wall, against which abuts one end of its so-called chapel, St. Stephen's, since converted into the County Hall. Wykeham, who was Constable for a while of the Castle, is supposed to have there made his first essay in military architecture. James I. gave the Castle and precincts to Sir John de Tichborne, who was the first to proclaim him King, at Winchester; his son, Sir Richard, and Lord Ogle held the fortress for Charles I., but it was eventually dismantled by Cromwell. The property then passed by gift of the Parliament to Sir William Waller, brother-in-law of Sir Richard, by whom (or his son) it was sold to the Corporation, who sold all to Charles II. for five shillings, under a deed of March 17, 1682. The King's House, or Palace, was settled upon Queen Anne's consort, in the event of her pre-decease. During the reigns of Kings George I.-III. it served as a prison for captives in war; at the outbreak of the French Revolution it was assigned to refugee priests, and in 1796 was converted into barracks. Since that time many changes have been made, so as to obliterate the older defensive works; on making the railway the ditch on that side was filled up level with the ancient mound for a new parade-ground. They took another part of the ditch for a widening of St. James's-lane, and nearly all the space between the barracks and Southgate-street has been acquired for purposes of the garrison. The mound is computed to have measured 850 ft. north to south, by 270 ft. east to west. The ditch, 30 yds. wide, fairly followed the line of the old wall. The hall, standing in the outer bailey, or sheriff's ward, measures 110 ft. by 55 ft. within, and is believed to be of temp. Henry III. Two arcades of clustered columns, having four shafts around a central



column, in Purbeck, divide it into a nave and two aisles, of five bays; at each end is a window of three lancet-lights, the side windows being later, as also is the open timber roof.\* The marble pillars presented by the Grand Duke of Tuscany for the palace staircase were given by George I. to the Duke of Bolton, who set them up in his house at Hackwood Park, near Basingstoke.

**A**MONG the correspondence which has been going on in the *Times*, under the title "A Traveller's Complaint," in regard to the inaccessibility of our cathedrals and churches, and what may be called the "guide" nuisance, we are glad to see testimony, in a letter signed "A. J." in the *Times* of Thursday, to the excellent and sensible way in which matters are now managed at Lincoln Cathedral. "A. J." says:—

"Visiting Lincoln last autumn, I was given, on dropping my sixpence into the collection-box for the restoration, &c., of the minister fabric, an excellent and clear plan of the building, 75 ft. to the inch, with nearly 100 references to its several portions, its shrines, tombs, &c., the whole illustrated by three pages of "Architectural and Historical Notes," admirable in their concise fulness, and giving, authoritatively, ten times the information to be gained from that gilt parrot-vergerism which irritated human nature is always prone to question. Furnished with this, the visitor is allowed to go over the whole building, unattended and unheeded—in fact, at his perfect, undisturbed leisure. I spent over two hours there with more profit and in greater comfort than my previous experience of cathedral-visiting at home and abroad had led me to believe possible."

It is to be hoped that so excellent an example may be appreciated and followed in other cathedrals. In too many of them the visitor is left in doubt which is the greater nuisance, the waiting until the time when the verger chooses to take him round, or the presence of the verger during the round.

## SOME CURIOUS FEATURES OF OLD PARISH CHURCHES.

BY H. LITTLEHALES.

THE following notes from various sources will probably supply a very fair idea of some of the more interesting pre-Reformation features which are still to be met with in the older churches of this country.

Unless very exceptional, no mention will be found of chalice, patens, sacramental fonts, wickets in doors, locks and keys, cadavers, heart burials, wooden effigies, aumbries, sun-dials, rood lofts and screens, round towers, piscinae, tiles, detached towers, foot covers, diminutive effigies, frescoes, consecration crosses, leaden fonts, quadruple sedilia, bench tables, low-side windows (chancel or western), painted glass, altars, anchorages, &c.

### BEDFORDSHIRE.

*Dunstable*:—Herse-cloth.  
*Elstow*:—Brass of an abbeys.  
*Luton*:—Great structure over font.

### BERKSHIRE.

*Abingdon (St. Helen's)*:—Five aisles.  
*Abingdon (St. Nicholas's)*:—Stone roods.  
Tower in church. Stone lantern projecting from the west wall.  
*Binfield*:—Sloping floor.  
*Cookham*:—Altar slab, with inlaid crosses of brass.  
*Fyfield*:—Credence and piscina combined.  
*Goosey*:—A tester over the altar, with the emblems of the Crucifixion.  
*Letcombe Bassett*:—Brickwork, probably thirteenth century.  
*Uffington*:—Octagonal central tower.  
*Long Wittenham*:—Piscina with a recumbent figure.

*Wytham*:—Glass from the country-house of the Abbots of Abingdon at Cumnor.

### BUCKINGHAMSHIRE.

*Chesham Bois*:—Brass of a chrismos child.  
*Denham*:—Brass of an abbeys.  
*Granborough*:—Chrismatory.

\* See *Smiche's* paper on The Hall and Round Table, in the Winchester volume of the Archaeological Institute, and the print in Warner's "Collections," circa 1795.

*Marston*:—Brass with representation of Death at a bedside.

*Taplow*:—Brass to a Medieval fishmonger.

### CAMBRIDGESHIRE.

*Burwell*:—Part of the brass of an abbot.  
*Guy*:—Doorway with triangular head.  
*Swaffham Prior*:—Two churches in one yard.  
*Swavesey*:—Altar steps of a chantry chapel.

### CORNWALL.

*St. Breage*:—Fresco depicting trade implements.

### CUMBERLAND.

*Uldale*:—Cuir bouilli case for chalice, fourteenth century.  
*Whitbeck*:—Cuir bouilli case, later date.

### DERBYSHIRE.

*Breadsall*:—Carved stone figure of the Virgin with the Dead Christ, coloured and gilt, height 2 ft. 5 in., found under floor 1877.  
*Chaddesden*:—Stone Gospel-desk.  
*Crick*:—Stone Gospel-desk.  
*Etwall*:—Stone Gospel-desk.  
*Michloway*:—Stone Gospel-desk.  
*Spandan*:—Stone Gospel-desk.  
*Melbourne*:—Hemispherical font.  
*Morley*:—Glass windows from Dale Abbey refectory.

*Sawley*:—Canon's tomb in a stone-vaulted bay, projecting from north wall of choir; reredos a stone wall cutting off the east end of the choir.

*Tideswell*:—Reredos a stone wall cutting off the east end of the choir.

*Youlgreave*:—Font, with projection for chrism. [This county is the only one of which the churches have been thoroughly investigated (See Cox's "Notes on Derbyshire Churches").]

### DEVONSHIRE.

*Dartington*:—Diminutive effigy in vestments.  
*Exeter (St. Martin's)*:—Font with recess.  
*(St. Patrick's)*:—Herse-cloth.  
*Newton Abbot*:—The lectern was found buried at Bovey Heathfield.  
*Paignton*:—Remains of Norman sedilia.  
*Stoke (St. Nectan)*:—Altar of stone with ornamental panelling.  
*Tavistock*:—Floor descends to the east with steps down into the chancel.  
*Tiverton*:—A pymer (Latin Version).

### DORSET.

*Bindon*:—Diminutive effigy in vestments.  
*Haslebury*:—St. Wulfrie's Shrine.  
*Rampisham*:—Churchyard cross has an ample base for preacher and remains of protecting canopy.  
*Whitchurch Canoniscom*:—St. Candida's Shrine.  
*Vimborne Minster*:—Crypt, with basin with no drain; in east wall medieval brass to King Ethelred; baptismal cruet for chrism.

### DURHAM.

*Dallton-le-Dale*:—Sun-dial on north wall, the time being indicated by the sun through the windows of south wall.  
*Houghton-le-Spring*:—External stoup.

### ESSEX.

*Great Bardfield*:—Triple chancel-arch, with brackets for rood and attendant figures.  
*Colchester (St. Martin's)*:—Indication of sanctuary-screen.  
*Dedham*:—Recess in chancel with chimney.  
*Little Easton*:—Brass, retaining colour.  
*Greenstead*:—Saxon church of wood.  
*Laiudon*:—Building attached to church.  
*Little Leighs*:—Effigy of a priest in oak.  
*Little Mapstead*:—Round church.  
*Margaretting*:—Profile brass, c. 1500.  
*Priltewell*:—Recess near font for chrism?  
*Stebbing*:—Triple chancel-arch.  
*Townstead*:—Triple chancel-arch.  
*Willington Doe*:—Two churches in one yard.

### GLOUCESTERSHIRE.

*Buckland*:—Glass representing three of the Sacraments.  
*Dowhurst*:—Brass of a lady with her dog "Terri."  
*Fairford*:—Glass.  
*Forhampton*:—High altar.  
*Leonard Stanley*:—Double walls.  
*Neuland*:—Brass depicting a miner with his candlestick in his mouth. High tomb with effigy in churchyard.  
*Staverton*:—Nave, resembles externally an inverted boat.  
*Twesbury*:—Sacrificing bell-case, &c.

### HAMPSHIRE.

*Ashley*:—Openings each side of chancel arch.

*Beaulieu*:—Magnificent pulpit projecting from the wall (the church the refectory of the monastery).

*Christchurch*:—Brackets in piscina, &c.  
*Dunmer*:—Canopy at one time over the rood.

*Easton*:—Four-centred chancel arch of the twelfth century.

*Ellingham*:—In the rood-screen can be traced the marks of a sloping desk, facing west; painting of the Crucifixion, hidden by plaster.

*Harley*:—Horseshoe chancel arch.

*Hayling, South*:—Brackets at one time supporting candle-beam (?).

*Headbourn Worthey*:—Stone rood; brass of a Winchester scholar.

*Isdworth*:—Scratched on the wall are some words of one of the services.

*Odiham*:—Font with projection for chrism (with inscription).

*Romsey*:—Hair, to some extent retaining the form of the head, with a thick plait, from the coffin of an Anglo-Saxon girl (?). Cresset stone.

*Swiners*:—Smallest apsidal Norman church; trefoil headed doorway.

*Watersell*:—Effigy of an abbeys.

*Wyke*:—Faten (early).

### HEREFORD.

*Brilley*:—Sanctuary screen and ceiling.

*Cladock*:—Tongs for removing dogs.

*Greenhill*:—Triple chancel arch.

*Leabury*:—Tomb of a lady, with semi-canopy and hanging drapery over the side.

*Mitchelchurch*:—Sanctuary screen and ceiling.

*Much Marvie*:—Tomb of a lady, with semi-canopy and hanging drapery.

*Peterchurch*:—In the apse is the ancient high altar, and on either side of the entrance to the choir is an altar.

*Roxstone*:—Candelabra.

*Urishay*:—An altar on either side of the entrance to the chancel.

*Wignore*:—Rood-loft piscina.

### HERTFORD.

*Eyot St. Laurence*:—Effigy in wood of the Boy Templar, 2 ft. 3 in.

*Barkway*:—Part of a "creation" window.

*Eyest*:—Burial in the wall with inscription.

*Guckland*:—Brass of a priest vested in a cope holding a chalice.

*Kelshall*:—Locker for processional cross.

*Sundridge*:—Chancel arch has a window on either side and "confessional" figures, one of a priest.

*Sandon*:—Chancel to ft. above nave with approach of fourteen steps.

### HUNTINGDONSHIRE.

*Conington*:—Effigy of a knight in the dress of a friar.

*Hemingford*:—Tomb of an abbot of Ramsey.

*Water Newton*:—Semicircular "Decorated" arches.

### KENT.

*Ath*:—External stoup with remains of rivets.

*Brabourne*:—Heart shrine.

*Capel-le-Ferne*:—Triple chancel arch.

*Cobham*:—The brasses.

*Delting*:—Finest wooden lectern.

*Doddington*:—Low side-window with desk, niche and aumbry.

*Eastchurch*:—Alms-basin of stone projecting beneath hagioscope.

*Eynsford*:—Bracket perforated with a hole through which may have passed the cord to draw the curtain in Lent or that for the sacring-bell.

*Folkestone*:—Reliquary.

*East Langdon*:—Cope and modern reproduction as an altar frontal.

*Lenham*:—Single sedile.

*Leysbourne*:—Heart shrine.

*Maidstone*:—Quintuple sedilia.

*Newington*:—Shrine (?)

*Osford*:—Easter sepulchre resting-place with eastern bracket.

*Rodmersham*:—Sedilia of wood.

*Ryars*:—Piscina, in the form of a tub; knocker c. 1480.

*Sandwich (St. Mary's)*:—A pyx.

*Smarden*:—Part of a reliquary with enamelled representation of Baptism, now on an alms-box. Part of an altar-slab remains in the wall.

*Slonlaud*:—Glass.

*Stone-in-Oxney*:—Offertory-basin in wall.

### LANCASHIRE.

*Cartmel Fell*:—Mutilated figure of our Saviour, probably the great rood, length 2 ft. 6 in.

*Chorley*:—Crypt; relics of St. Laurence.

*Hornby*:—At the Roman Catholic church, chalice, inscribed, "Restore me to Caton."

*Layland*:—At the Roman Catholic church,

chalice, inscribed, "Restore me to Layland in Lankshire."  
*Winwick* :—Brass of a man in both armour and chasuble.

## LEICESTERSHIRE.

*Ashby-de-la-Zouch* :—Finger pillory for brewers; pilgrim's tomb.  
*Buckminster* :—Very rich staircase to rood-loft.  
*Castle Donington* :—Effigy of an abbot.  
*Easington* :—Bracket for a figure, with a smaller bracket having a socket for a candle.  
*Leicester (St. Mary's)* : Norman sedilia.  
*Orton-on-the-Hill* :—Effigy of a Cistercian abbot.  
*Twycross* :—Glass from La Sainte Chapelle.  
*Wymeswold* :—Chalice, probably originally a pyx.

## LINCOLNSHIRE.

*Bracebridge* :—Chancel arch, 5 ft. in width, with a window on either side.  
*Bradley* :—Font, inscribed, "Pater noster ave Maria and crede Iren ye Child yt es nede."  
*Burton Pedwardine* :—Recess for relic.  
*Claypole* :—Altar. Three sedilia in transept.  
*Corby* :—Figures of a knight and lady under drapery.  
*Cotes-by-Slow* :—Altar slab with six crosses.  
*Croft* :—Lectern found in the moat of the hall.  
*Damley* :—Font was a stoup.  
*Dunsby* :—Descent into chancel.  
*Everby* :—Reliquary.  
*Frampton* :—Buttress with inscription and a bust.  
*Harlaxton* :—Double doorway.  
*Holdingham* :—Strainer arch.  
*Halton-le-Clay* :—Narrow chancel arch.  
*Horkstow* :—Elevation of chancel. Sloping floor.  
*Ingoldmells* :—Brass inscribed William Palmer with ye stylt 1520.  
*West Keal* :—Pictorial capitals.  
*East Kirby* :—The resting-place for the Easter sepulchre has a projecting basin for offerings.  
*Lulton* :—Brick, even the piers and arches.  
*Moulton* :—Many brackets project from walls and pillars. Window cill an altar (?)  
*Saxoby* :—Sloping floor.  
*Spalding* :—Five aisles.  
*Long Sutton* :—Octagonal vestry.  
*Tupholm* :—Remains of Norman cloister.  
*Walcot* :—Inverted piers of nave.  
*Wellington* :—Norman sedilia.  
*Whaplode* :—Tower forms a transept.  
*Wickenby* :—The font retains its ancient fastening of an iron bar across.  
*North Witham* :—Floor descends from the west.

## NORFOLK.

*Antingham* :—Two churches in one yard.  
*Attleborough* :—Latten figure of a saint, probably from a book-cover found whilst digging a grave.  
*Baconthorpe* :—Stoup in respond.  
*Barnham* :—Sepulchral wheeled cross seats shorter near font to allow passage for processions.  
*Barton-St. Mary* :—Doorway of unusual form.  
*Billingford* :—Two stoups one over the other.  
*Blickling* :—Pew bearing name of occupant.  
*South Burlingham* :—Stone lectern.  
*Causton* :—Cuir bouilli case for chalice.  
 Figure of the Blessed Virgin, said to have been one of the attendant rood figures, and other remnants of the rood accompaniments. St. Jerome on the screen wears spectacles. Plough loft with inscription; alms-box. Remarkable aperture in north wall of chancel.  
*Easington* :—Grave slab retaining the metal in the marginal letters.  
*Fitchlake* :—Alms basin. Fragment of a processional cross (?)  
*Hastwood* :—Ancient church belongs to the Roman Catholics.  
*Hedon* :—Sculptured tablets, one representing a priest at the altar.  
*Holme-next-the-Sea* :—Latten crucifix.  
*Kildwick* :—Glass from the abbey of Fountain and Bolton. From the length of the church it is known as the "Lang church of Craven."  
*Lastingham* :—Crypt.  
*Nun Monkton* :—Font with recess.  
*Partington* :—Ancient steps of altar. Pendant for a light.  
*Selby* :—Lavatory.  
*Studley* :—The font is a copy of the holy water stoup at Fountains Abbey.  
*Tanfield* :—Confessional (?) Herse.  
*Chedgrave* :—Glass from Rouen Cathedral.  
*Cotton* :—Remains of a confessional (?)  
*Cromer* :—Recess for processional cross.  
*Halvergate* :—Recess for processional cross.

*Hessingham* :—Recess for processional cross.  
*Felmingham* :—Great width of doorway for processional purposes.

*Gillingham* :—Two churches in one yard.  
*Harham* :—Remains of a confessional.  
*Harpley* :—On the roof is the life-sized figure of a seated priest reading a book. Sedilia in south aisle.

*Hesingham* :—Ground piscina.  
*Knapton* :—Semi-circular-headed windows with "Decorated" mouldings and "Perpendicular" tracery.

*Ludham* :—Rolled-up picture of the rood and attendant figures. Platform before rood-screen. Rood-beam independent of loft; alms-box.  
*Lyng* :—Copes, now an altar-cloth.

*Mellon Constable* :—Low side window with seat and stone desk.

*Northwold* :—Easter sepulchre resting-place.  
*Norwich (St. Peter-pan-Mounter-gate)* :—Spoon (1613) having on it a crucifix of probably earlier date.

*Norwich (St. Gregory)* :—Herse-cloth, altar-cloth, sanctuary, knocker, elevation of altar.  
*Norwich (St. James)* :—Vestment, now an altar-cloth.

*Norwich (St. Peter-at-Hungate)* :—Sculpture on buttress.  
*Penney* :—Internal Norman wall arcade.

*Potter Hagham* :—Rood-beam independent of loft.

*Ranworth* :—Winch used in connexion with the light before the suspended pyx. Rood-screen most elaborately painted, and having projecting wings and small apertures in the heads of the panels. Representation on a panel of SS. James and Joseph, one with a toy mill the other blowing bubbles. Altar at each side of the entrance. Double wooden lectern, having painted on it some words and music.

*Relesby* :—Relic-chamber in chancel.  
*Salhouse* :—Sacrificing-bell in original frame in rood-screen.

*Salhouse* :—Window-cills form seats.  
*Scarning* :—Sacrificing-bell in original frame in rood-screen.

*Sherringham* :—Ground piscina.  
*Sidestrand* :—Mural cross.

*Sneththam* :—Galilee.  
*Snoring Parva* :—Doorway of unusual construction.

*Long Stratton* :—Sexton's wheel for deciding the period of a fast.

*Swafton* :—Carvings on tower and seats of a pedlar and muzzled dog, referring to a benefactor.

*Trunch* :—Porch buttress over priest's door.

*Piscina* on north side.  
*Tunstead* :—Platform behind altar, with chamber beneath; rood-beam independent of loft.

*Upton* :—Piscina with no covering.  
*Walpole (St. Andrew's)* :—Great bracket.

*Walpole (St. Peter)* :—Stone canopied-stalls, passage beneath choir, and consequent elevation of altar.

*North Walsham* :—Representation of the Annunciation, the angel being clad in a dalmatic.

*West Walton* :—Early English bell-tower, forming an entrance to the churchyard.

*Wiggenhall (St. Peter)* :—Piscina unusually placed.

*Worstead* :—Plough light inscription. On a panel of the rood-screen is represented a bearded female saint.

*Yarmouth* :—Remains of confessional (?) Quintuple sedilia.

## NORTHAMPTONSHIRE.

*Brington* :—Owner's badge on pew.

*Brixworth* :—Church at one time a Roman basilica (?) Stone reliquary.

*Chipping Warden* :—Stone lectern.  
*Coggenhoe* :—Stoup in pillar.

*Crick* :—Heraldic tracery.  
*Earl's Barton* :—Norman sedilia.

*Ellon* :—On a jamb of the porch is a cross, the meaning of which is yet to be explained.

*Finedon* :—Straining arch of great beauty.  
*Grendon* :—Norman piers of bulk.

*Heyford* :—Font with bracket.  
*Lowick* :—Glass.

*Maxey* :—Rood loft piscina.  
*Paston* :—Low side-window with ironwork not permitting the passage of anything over 5 in. in width.

*Pitsford* :—Font with traces possibly of a book-rest.

*Rothwell* :—Triple piscina; crypt with bones.  
*Rushden* :—Straining arch of great beauty. Bocher arch.

*Rushton* :—Tomb of a prior.  
*Stanford* :—Glass, saved from the Puritan soldiers by the inmates of the neighbouring hall.

*Sudborough* :—Brass of a priest in an alb and stole.

*Tansor* :—Floor rises from the west.  
*Ufford* :—Low side window not permitting the passage of anything about 5 in. in width.

*Wicken* :—Lace from Laon Cathedral, buried for some time at the Revolution.

*Wittering* :—Imposts of chancel arch.

## NORTHUMBERLAND.

*Brinkburn* :—Natural colours and time tints of the stone of the whole of the interior.

*Bywell St. Peter* :—Coign stones worn by sharpening weapons.

*Halwisttle* :—Pilgrim's tomb, with sculptured staff.

*Hexham* :—Effigy of a prior, crypt, sanctuary seat staircase.

## NOTTINGHAMSHIRE.

*Avon Dassett* :—Effigy in the vestments of a deacon.

*Linton* :—Foliated bowl of font.  
*Newark* :—Immense brass.

## OXFORDSHIRE.

*Addenbury* :—Pictorial cornices.

*Bekley* :—Font with stone desk on adjoining pillar.

*Blaxham* :—Painted glass figure of Wolsey with nimbus, said to have been erected in his lifetime.

*Cassington* :—Remains of alms-dish.  
*Chipping Norton* :—Brass of an ironmonger and his wife. Octagonal porch.

*Cogges* :—Octagonal tower placed obliquely at west end.

*Cokethorpe* :—Churchyard with no defined boundary.

*Cosmef* :—Pulpit projecting from the wall with fine mural staircase.

*Dorchester* :—Alms-basin. Brass of an abbot. Cut on a window of the choir is a figure of a clerk with holy-water vessel and sprinkler.

*Elyfield* :—Low side-window with seat and desk.

*Marston* :—Fifteenth-century secular vessel used as a communion cup.

*Shiplake* :—Seven windows of painted glass from St. Omer.

## SUSSEX.

*Little Casterton* :—Ground piscina.  
*Oakham* :—Pictorial capitals.

*Tickenole* :—Rich Norman chancel-arch distorted.

*Tin-all* :—Reliquary.

## SHROPSHIRE.

*Battlefield* :—Figure of the Blessed Virgin and dead Christ in oak, nearly 4 ft. high.

*Easthope* :—Sanctuary knocker.

*North Lydbury* :—Altar in north transept.

*Madeley* :—Two fourteenth-century chasubles.

*Melverley* :—Immense timber choir-screen.

*Shifnal* :—External canopied tomb in chancel wall (at the Roman Catholic church). A chalice inscribed, "Restore me to Sheafal in Shropshire."

*Shrewsbury* :—An alb (?) Tomb of an acolyte (?)

*Tong* :—Cup with glass bowl.

*Woolstaston* :—Double font.

*Worfield* :—Sloping floor.

*Wroxeter* :—Font formed from a Roman column.

## SOMERSETSHIRE.

*Barton St. David's* :—Octagonal tower.

*Bridgewater* :—Hagioscope through three walls.

*Cheddar* :—Respond of singular richness.

*Chedday* :—Vestment, found buried, now an altar-cloth. Stones worn by sharpening of weapons.

*Cheuton Mendip* :—Secular cup, now a chalice.

*Compton Martin* :—Twisted pillar.

*Clifton-in-Gordano* :—Altar candlesticks of latten.

*Claverton* :—Alms-dish.

*Keustoke* :—Reliquary of stone, probably containing at one time a relic of St. Thomas of Canterbury.

*Tintinhull* :—Church house.

*Stanton Fitzwarren* :—Font, with names of the virtues and vices.

*Trull* :—Glass representation of the procession before service, carved on the ends of some pews.

*Pulpit*.

*Willow* :—Foliated bowl of font.

## STAFFORDSHIRE.

*Ham* :—Shrine.

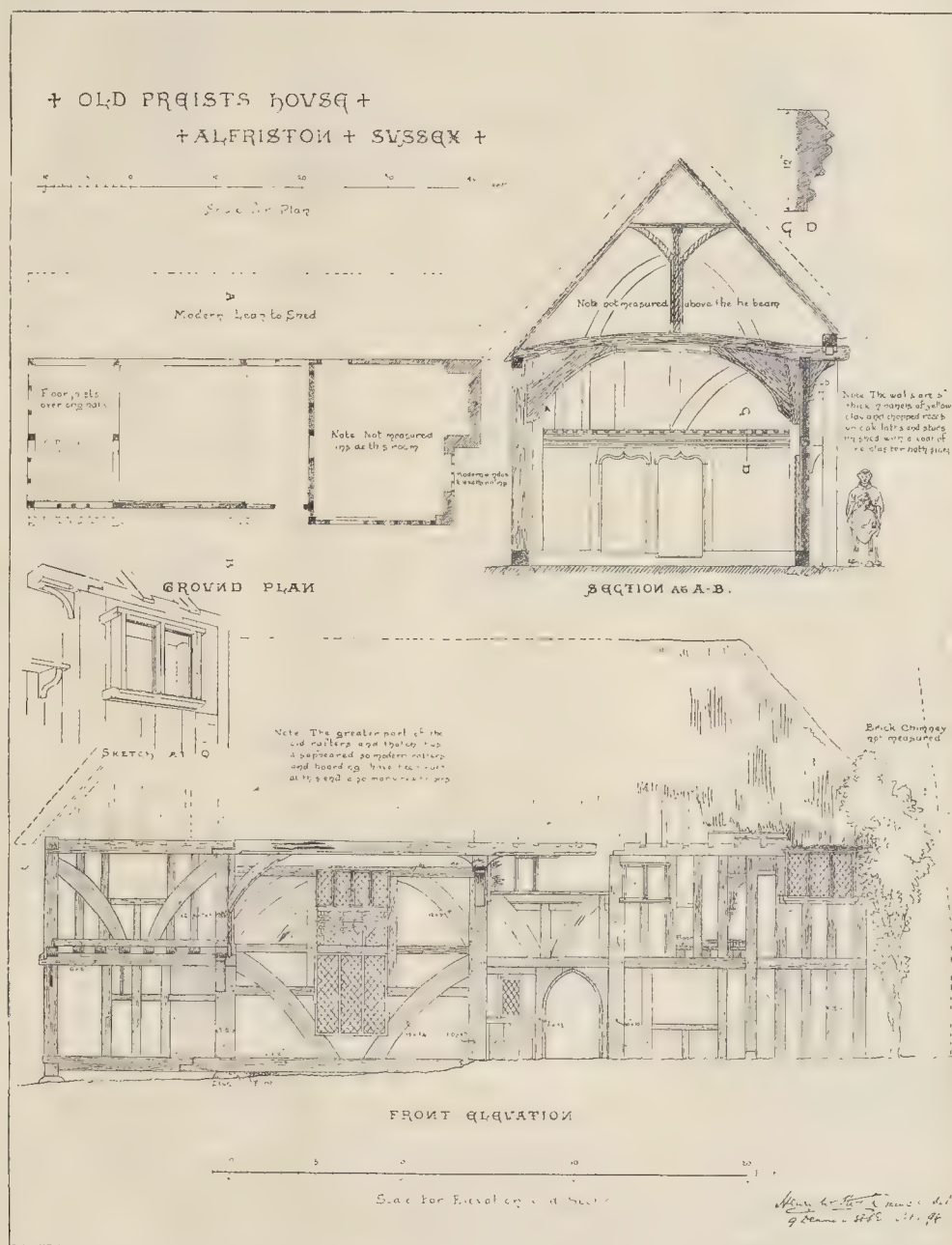
## SUFFOLK.

*Baddingham* :—Sloping floor.

*Barnby* :—Lectern for the processional cross.

*Blythburgh* :—Jack o' the clock. Reliquary.





*Bramford*:—Triple chancel arch.  
*Frankingham*:—Organ-case, c. 1520.  
*Greensborough*:—Sanctuary knocker.  
*Horstead*:—Sacrificing bell in rood-screen.  
*Hessett*:—Burse; veil for the suspended pyx.  
*Hitcham*:—Platform before rood-screen.  
*Mickfield*:—Knocker.  
*Mildenhall*:—Stone with grooves, probably worn by the ropes of the sanctus bell.  
*Southwold*:—Jack o' the clock.  
*Stonham Aspal*:—Knocker.  
*Sudbury*:—In a niche is the head of Archbishop Sudbury.

*Trintley*:—Two churches in one yard.  
*Thorpe Morieux*:—The floor of the nave descends from the west.  
*Great Wenham*:—Chrismatory (?)  
*Vaxley*:—Sexton's wheel for deciding the period of a fast.

## SURREY.

*Frensham*:—Cauldron for church ales.  
*East Horsley*:—Brass of a kneeling bishop.  
*Lingfield*:—Confessional (?)

## SUSSEX.

*Conyfold*:—Prior Nelond's brass.

*Ditchling*:—Fiscina in north wall.

*Fletching*:—The glass of three windows was dug up near the south wall of the chancel, brass of a glove, with gloves.

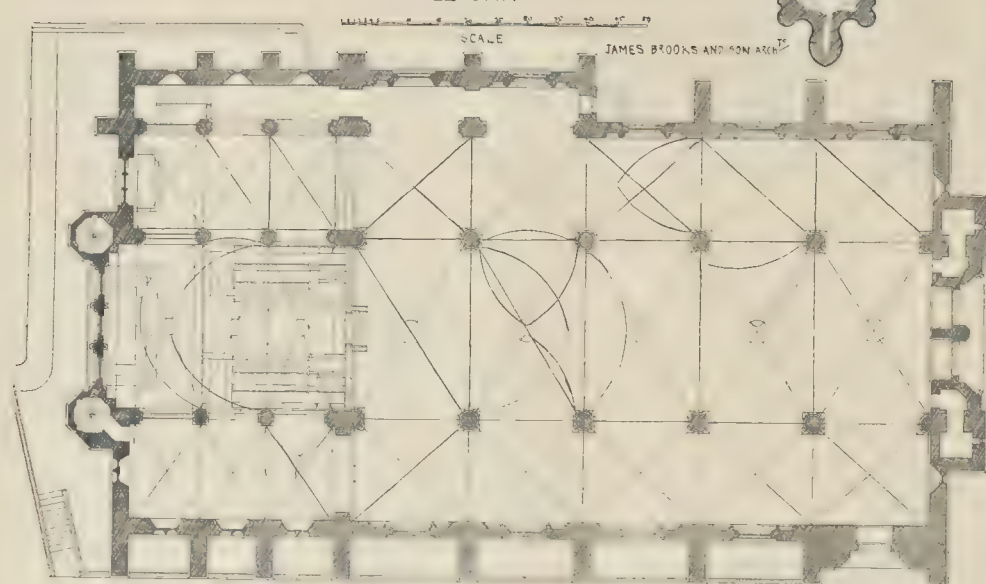
*West Grinstead*:—In the roof over the alta remains part of the mechanism for suspending the pyx.

*Horsham*:—Brass showing the arrangement of the stole.

*Ilwstierpoint*:—Horse.

*Shipley*:—Reliquary of metal, c. 1100 (in the vicar's care).

# ALLHALLOWS CHVRCH GOSPEL OAK



Plan of Church of the Good Shepherd (now "All Hallows"), Gospel Oak.

## WARWICK.

- Bilton* :—Rood-loft, piscina.  
*Lapworth* :—Relic-chamber.  
*Polesworth* :—Effigy of an abess.  
*Shotteswell* :—The cill of a window forms a chantry altar.  
*Sutton Coldfield* :—Effigy of a bishop with staff on right side.  
*Warminster* :—The cill of a window forms a chantry altar.  
*Warwick* :—Herse; confessional (?)  
*Wooten Wawen* :—Chancel-arch, less than 5 ft. in width.

## WESTMORELAND.

- Kirkby Lonsdale* :—Variety of styles.  
*Lowther* :—A horse-shoe nimbus on a stone in the churchyard.

## WILTSHIRE.

- Allington* :—Low side window, with seat and desk.  
*Bishops Cannings* :—Confessional.  
*Brilford* :—Three small Roman arches.  
*Castle Combe* :—Chancel arch has niches, figures, and canopies.  
*Charlton* :—Squint through two walls.  
*Chisleden* :—A fine consecration cross, representing the Crucifixion.  
*Compton Bassett* :—Stone rood-screen.  
*Combe Bisselt* :—The plinth of a column is extended to receive the font.  
*Credwell* :—Five of the Sacraments in glass.  
*Enford* :—Octagonal vestry, with passage leading to it.  
*Malmesbury* :—Window projects from triforium arcade.  
*Purton* :—Two spires.  
*Salisbury (St. Thomas)* :—Inscribed capitals.  
*Stockton* :—Chancel arch, having on each side a small opening. Effigy of a female (of the fourteenth century) reclining on one side, clearly its original posture.  
*Warborough* :—Two spires.  
*Yatton Keynell* :—Stone rood-screen.

## WORCESTERSHIRE.

- Crowle* :—Marble lectern, c. 1218, dug up near the ruins of Evesham Abbey.  
*Huddington* :—Confessional (?)  
*Kempsey* :—Piscina with three brackets, and traces of a shelf also.  
*Malvern* :—Tiles, one bearing a remarkable inscription.  
*Martley* :—Incense ship and sacring bell, both found beneath the pulpit.  
*Olden* :—Glass.  
*Stouton* :—Vestment.

## YORKSHIRE.

- Bedale* :—Herse.  
*Beverley (St. Mary's)* :—Minstrels' pillar.  
 Inscriptions on pillars.  
*Brandsburton* :—Niche having one side splayed right away.  
*Bridlington* :—Stone offertory box.

H. L.

## AN ANCIENT PRIESTS' HOUSE.

THIS is a measured drawing showing the present condition of the ancient timber-built priests' house, at Alfriston, Sussex. The drawing was made by Mr. Henry W. Stock, from measurements at the building. He observes that the interior of the house is so gutted that he has been able to show very little of the interior arrangements.

Both the end rooms have the remains of large open fireplaces of stone, with moulded edges, the exterior portion of brick, and probably contemporary with the house. The church adjoining is of Perpendicular date, the house having been probably built at the same time.

The rector is interested in the preservation of the house, and has made a start in restoring it, intending to use it as a parish room, but funds are much wanted for proceeding with the work (see page 473).

## TRADE CIRCULARS.

MESSRS. H. F. JOEL & Co. send us the new and revised edition of their illustrated catalogue of plant and materials for electric lighting, which also contains a good deal of information as to the fixing and moving of dynamos, motors, arc lamps, &c., which may prove useful to those who, in the colonies or in the provinces, are out of the way of assistance in such works. — Messrs. James Guthrie & Co. send an illustrated catalogue of their "Hygienic Oil Heating Stoves," which as portable heating stoves independent of flues should be very convenient and useful in many situations; but why are they "hygienic"?

WINDOW, ST. CUTHBERT'S, BLYTH.—Stained glass has just been inserted in the four-light west window of this church. The subjects chosen were four of the corporal acts of mercy, thus being suggestive of the person memorialised, the late Dr. Ward. Each subject is complete in itself, with fifteenth-century canopy-work at the top and bottom. The work was carried out from the directions of Messrs. Hicks & Charlewood, architects, Newcastle, by Messrs. Percy Bacon & Brothers, of London.

## Illustrations.

### DESIGN FOR COMPLETION OF THE SOUTH KENSINGTON MUSEUM.

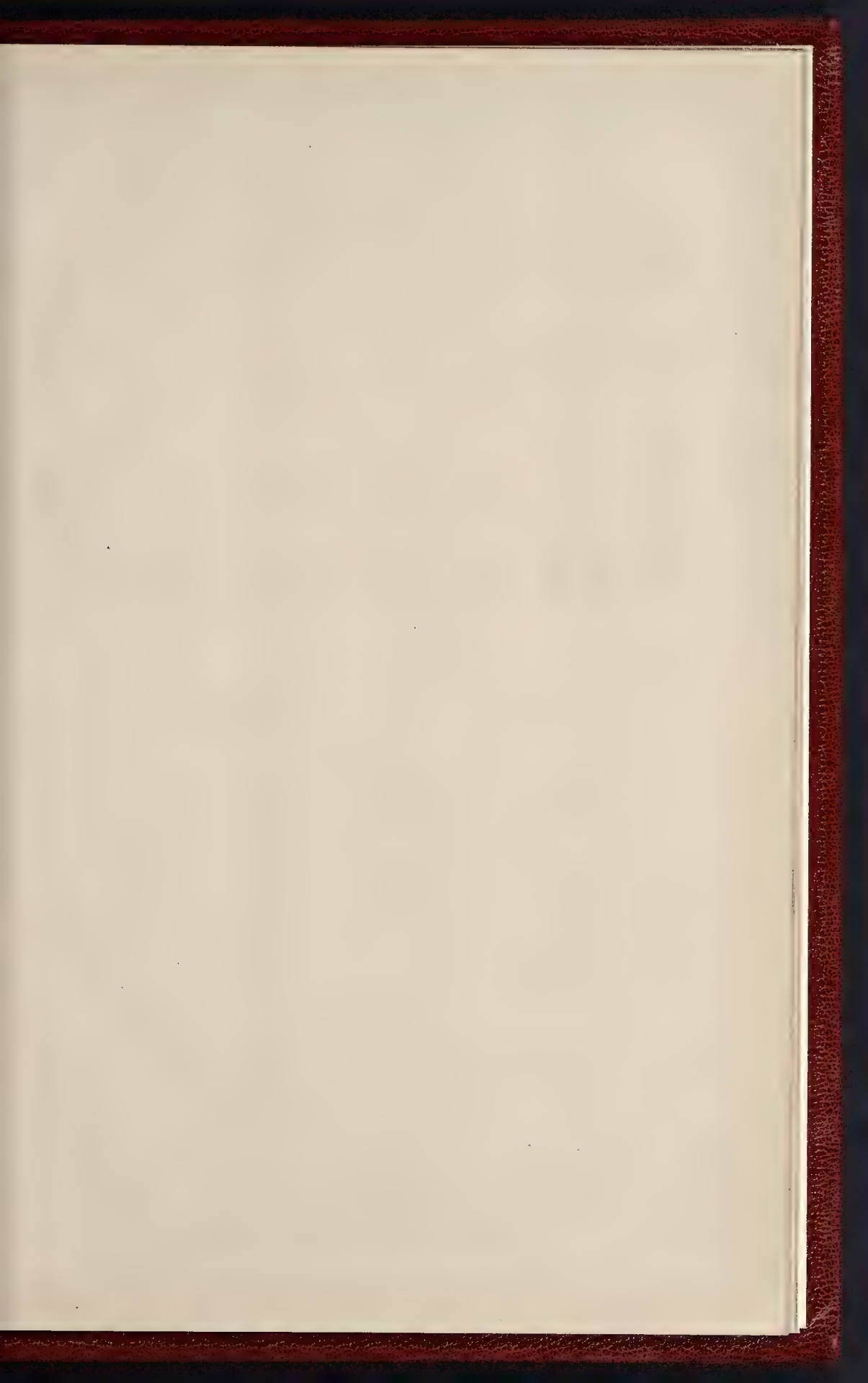
THIS illustration is from an admirable and broadly-treated drawing, in Indian ink, by Mr. McGuinness, R.H.A., and is a perspective view of the design for the completion of South Kensington Museum by Mr. John Belcher.

### CHURCH OF THE GOOD SHEPHERD.

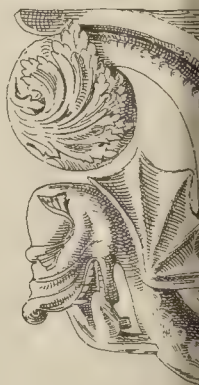
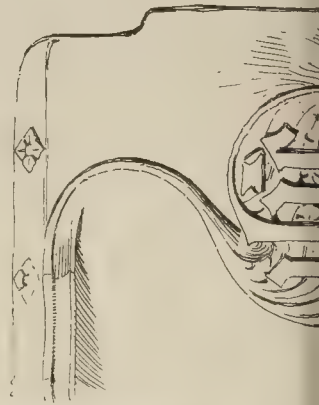
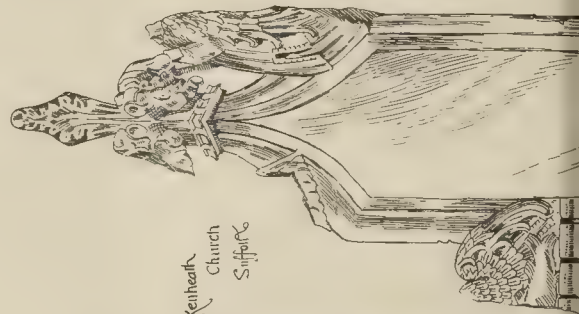
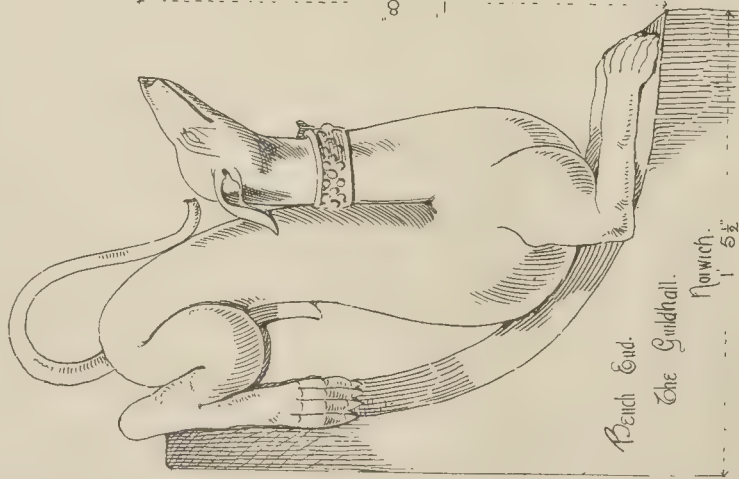
SINCE making the plans for this church, owing to a grant made by the Ecclesiastical Commissioners from the sale of the site of All Hallows Church, Upper Thames-street, a new ecclesiastical parish has been formed, and called All Hallows, North St. Pancras, the endowment from the ancient church being assigned to the recently-formed parish, once known as the Good Shepherd, but for the future to be called All Hallows. The site of the church is bounded on the east by Courthope-road, on the west by Shirlock-road, on the north by Savernake-road, on the south by a small portion of vacant land, on which at some future time it is intended to erect a parish hall.

The church is being erected in Ancaster stone, with a core of Portland stone cement concrete. The width of the church within the walls is 64 ft., the length of nave and north and south aisles is 96 ft., chancel 42 ft. 6 in. long, the north and south aisles 37 ft. The south aisle is fitted up to be used as a chapel, having a separate entrance out of a small aisle or passage. Owing to the great fall of the ground from west to east a crypt has been formed under the north and south chancel aisles and under the chancel, giving a parish-room under the north chancel aisle, a choir vestry under the south chapel, and a large vaulted clergy-vestry under the chancel. At the east end of the chancel are two octagonal turrets having staircases leading up to the gutters and for repairs of roofs. At the west end are two square turrets. The nave has five bays, the chancel three. All parts of the church, chancel and aisles, are groined in stone springing from and growing out of cylindrical shafts 2 ft. 8 in. diameter, the springing being 28 ft. from the level of nave floor. Owing to the great thrust of the groining the buttresses project 7 ft. from the external face of the wall, and are carried up without any weathering for about 20 ft., and then have a gentle slope to about 3 ft. of the wall. The accommodation is for nearly 1,400, and the approximate





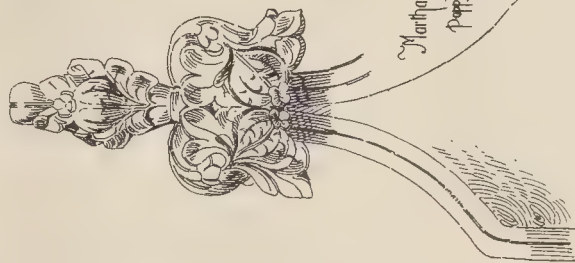
# Clayside Notes in East Anglia by John Shewell (order, Archt. BENCH ENDS



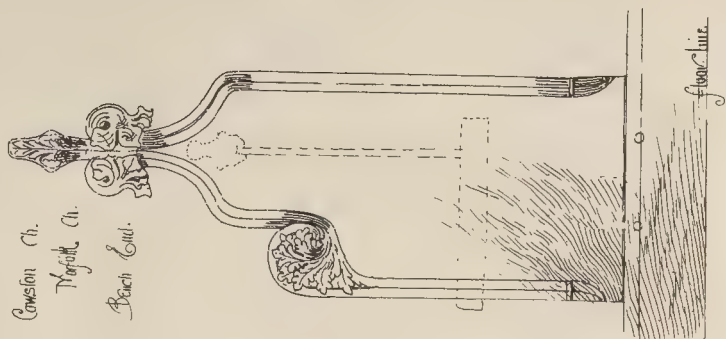




Carving under Misereere  
Clay. Ch. Norfolk.



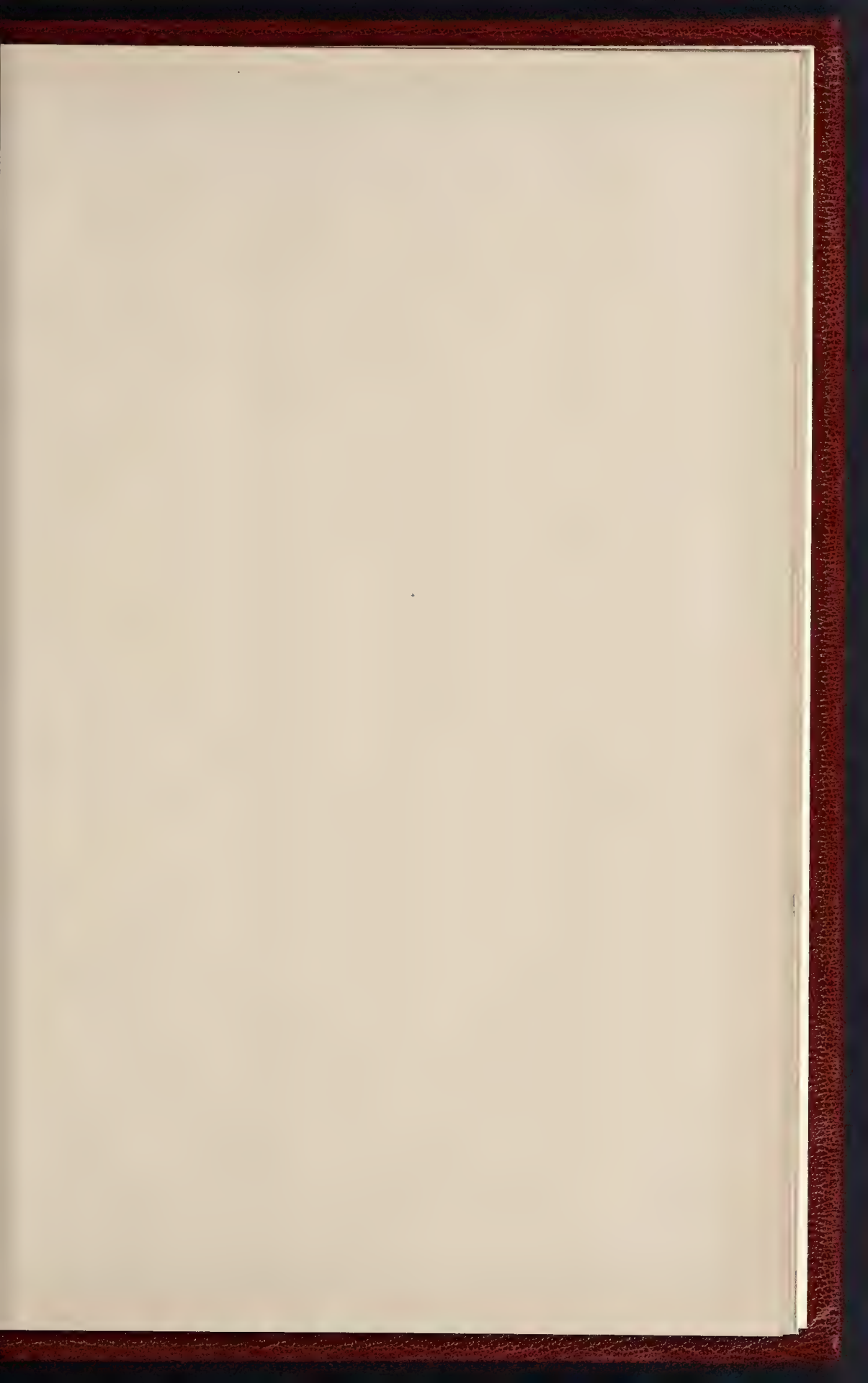
Martham Ch. Norfolk.  
Puppy head.  $11\frac{1}{2} \times 7$   
S. Aisle.



Cowson Ch.  
Mafolk Ch.  
Bench End.





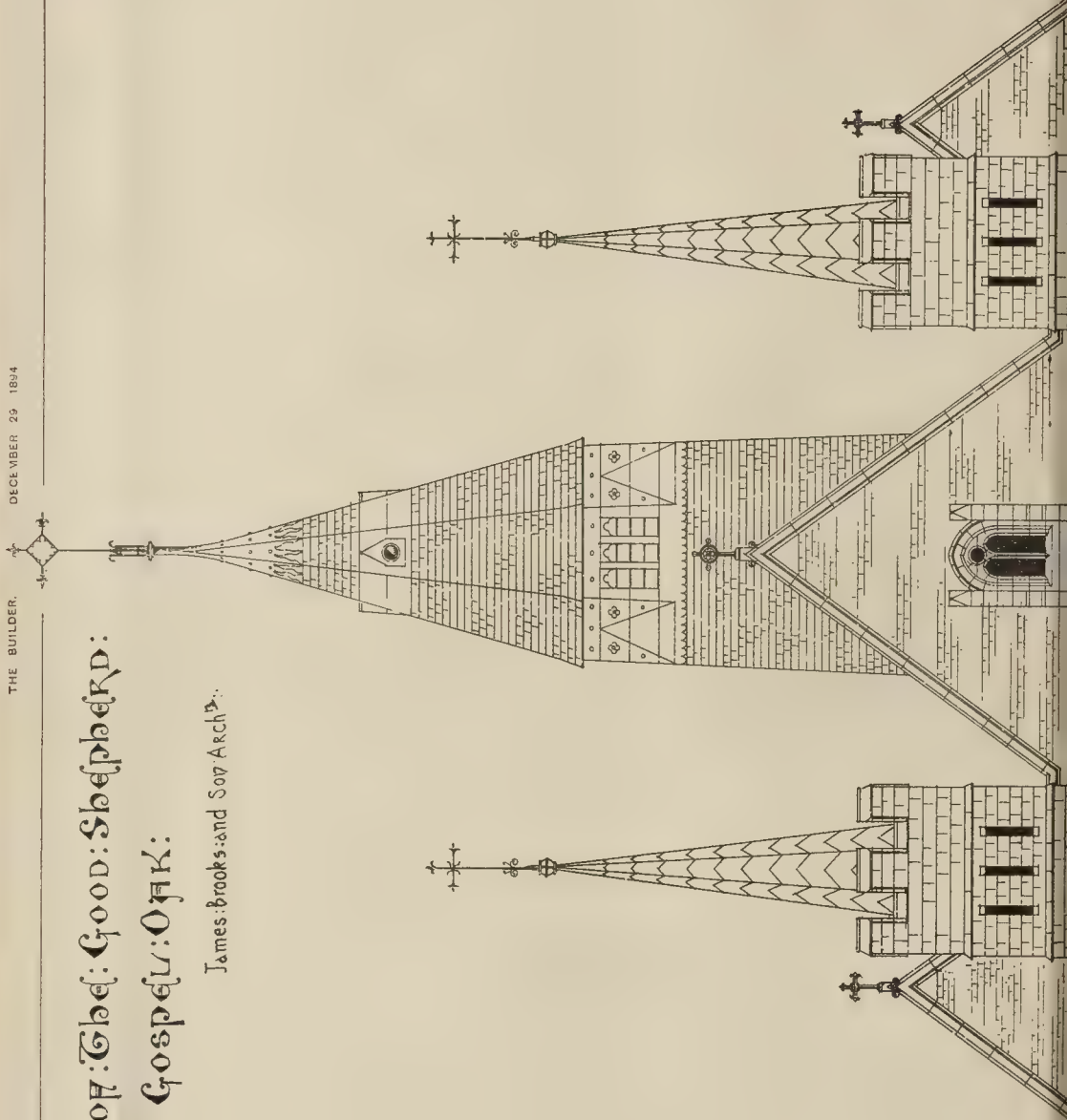


THE BUILDER.

DECEMBER 29 1894

# Church of the Good Shepherd: Gospel of Mark:

James Brooks and Son Architects.

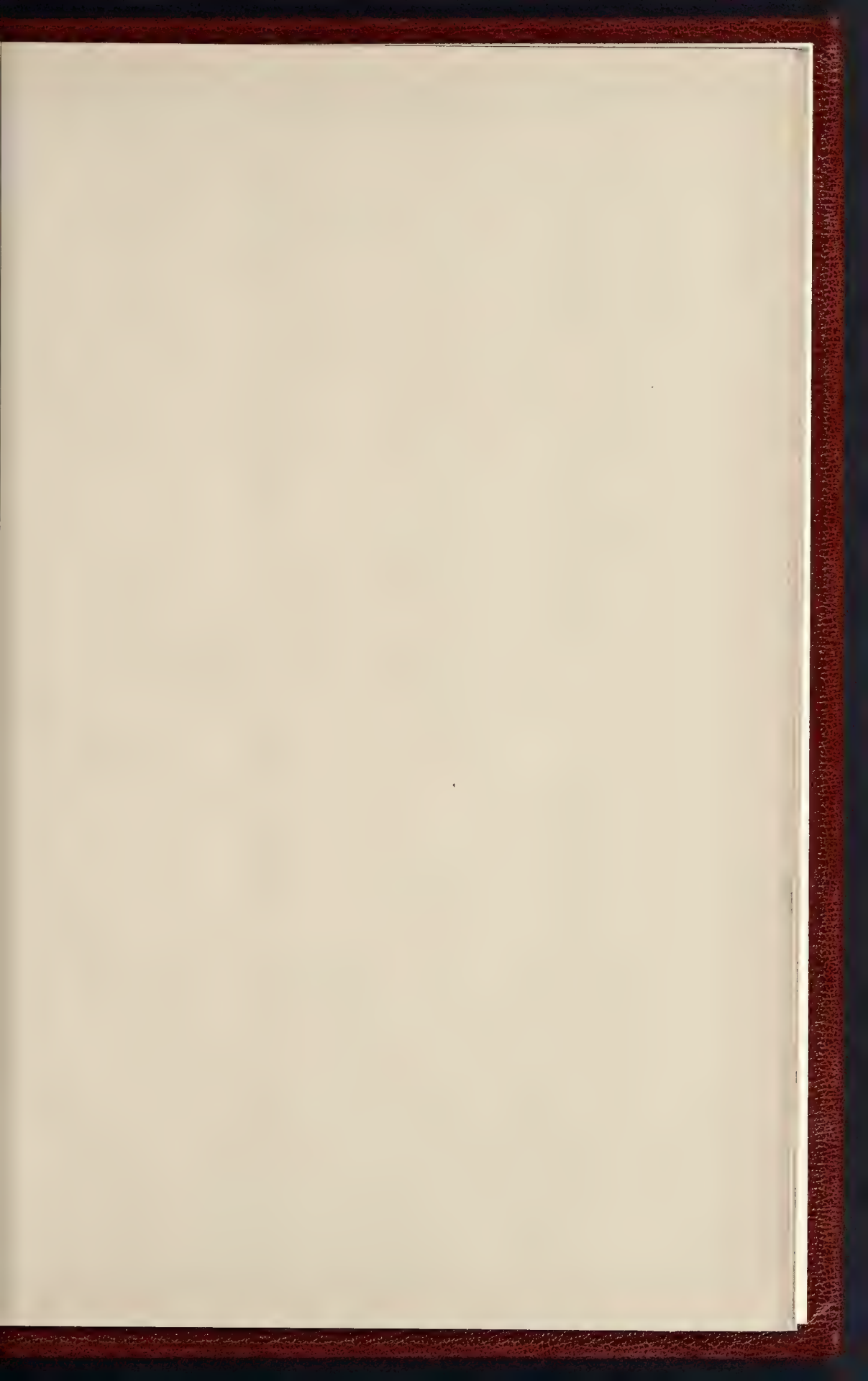






THE BUILDER. 4. DECEMBER 29 1894

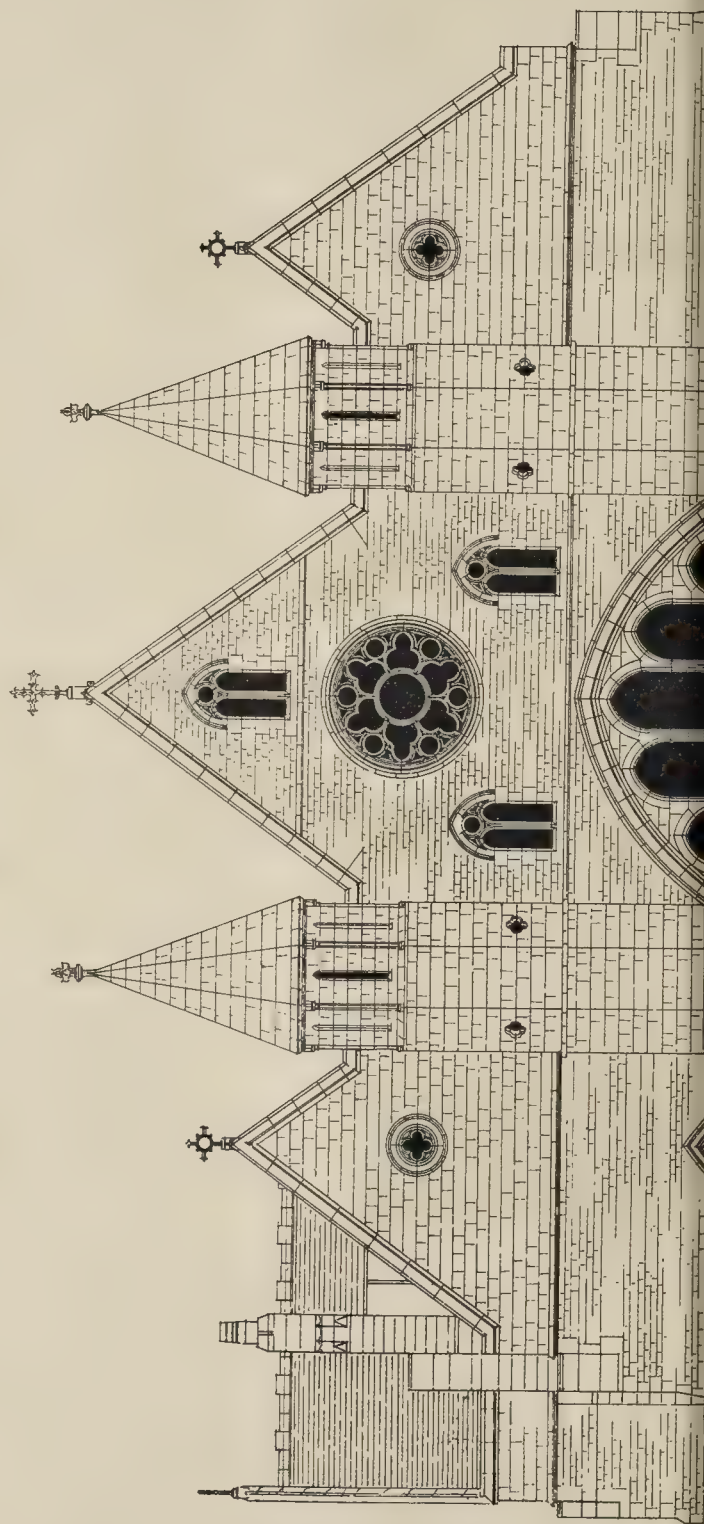




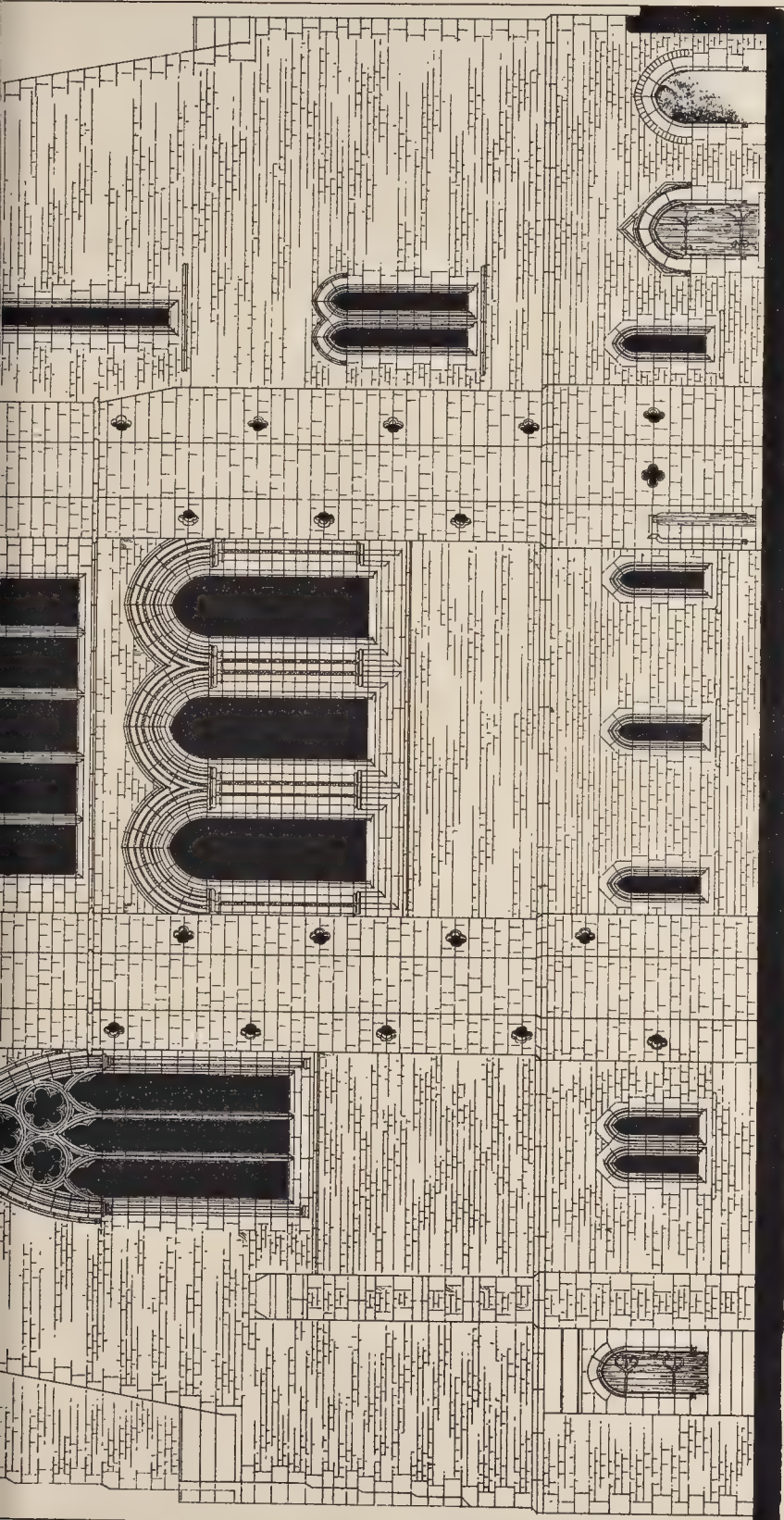
THE BUILDER, DECEMBER 29, 1894.

# Church of the Good Shepherd: Gospel: Mark:

James Brooks and Son Architects







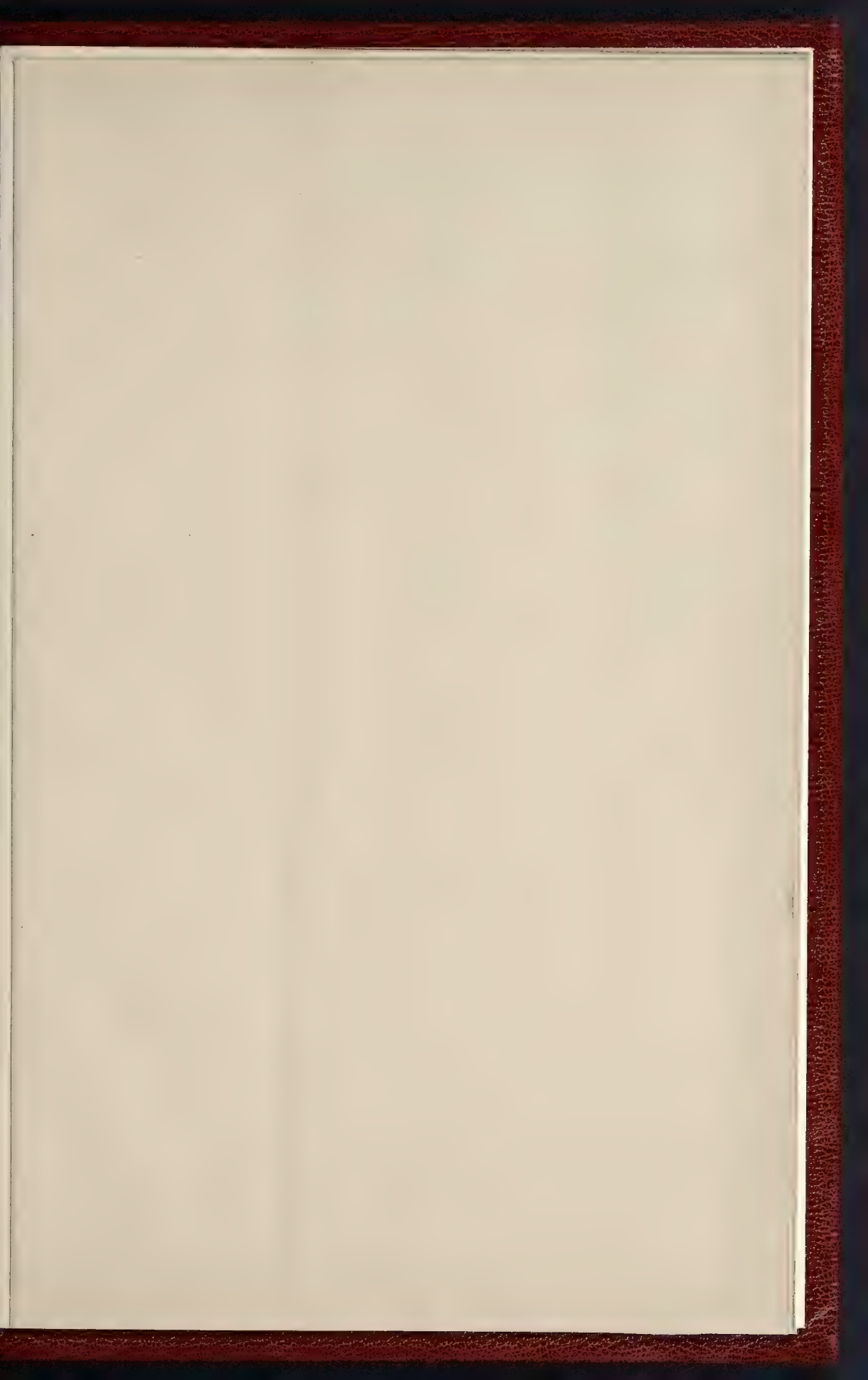
ഭിത്തി: പുറംഭാഗം



PHOTO. THE SPENCER & CO. 14, EAST HADGATE STREET, LONDON E.C.







THE  
NEW  
BUILDER





DESIGN FOR THE COMPLETION OF THE KENSINGTON MUSEUM. BY MR. TOWN AND MR. LUTY.





cost is about 18,000*l.* Messrs. James Brooks & Son are the architects.

#### WAYSIDE NOTES IN EAST ANGLIA.

It would be difficult to find a part of England so rich in old oak carving as East Anglia. Nearly every village church has some, and several have many specimens. Of screens there is an abundance; the many carved roofs are amply exemplified in Brandon's Book, and all architectural students find there a happy hunting-ground for ornamental detail of all descriptions.

The technical detail of Gothic Architecture has, in nearly every county, great similarity during the various epochs or stages of its development. But the same cannot be said of the carvings, and this is of necessity the case, because much depends on the individual carver, and so many influences affect him apart from the canons of his art. Thus in towns where large industries have been formerly carried out, which industries owed their rise to foreign refugees, we find this influence affecting the carving to a large extent, and traits are clearly discernible which are quite distinct from those of other localities, even in the close proximity.

These Gothic carvings are very unequal in merit, and we often find a specimen of great beauty, embodying emblems of Purity and Religion, side by side with some hideous grotesque, the hidden significance of which is hard to discover.

As Gothic architecture approached the wane these fabulous creatures became more and more prevalent, indicating the spirit of the times, until at length a most unhealthy tone prevailed which continued till the close of the style.

These carvings are intensely interesting, even in their bad period, and are worthy of more than a passing study.

They had a distinct value at the time of their execution, and many an object lesson was inculcated by their means. Take for instance the bench-end at Cawston, where the devil is seen devouring a man; or at Norwich Cathedral, with the pelican in its piety picking its breast till the drops of blood stream down into the open mouths of the expectant offspring.

Then who, again, can gaze at the bench-end from Lakenheath and not feel impressed by the devout appearance of the two angels praying, with their small open books resting on the poppy-head. Even in their mutilated condition they preserve a sanctity which the hatchets of Downings, the Parliamentary destroyer, could not efface.

The example from Blythburgh bears the armorial bearings of the lord of the manor and benefactor of the church, and the same heraldic idea is conveyed by the greyhound, ducally gorged, in Norwich Guildhall.

At Martham and Cawston we see the ordinary treatment of the poppy-head, with a conventionalised foliage device, of which hundreds of examples are to be found throughout the country.

Anyone willing to brave the fatigues of a somewhat tedious route will be well repaid by a visit to Lakenheath. It is situated on a cross line from Thetford to Ely on the eastern margin of the fens, in a very isolated position.

All round the town, which, by-the-way, is two miles from the station, stretches a sandy waste inhabited by countless numbers of rabbits.

The town is a very old one, and even before 1200 A.D. had a market which was abolished by the Abbot of Bury, and again revived in 1309 by a grant from the Prior and Convent of Ely. The Dean and Chapter of Ely are patrons of the vicarage, and were appropriators of the Rectory and Lords of the Manor from the Dissolution of the Monasteries until, a few years ago, when the Rectory and Manor were transferred to the Ecclesiastical Commissioners. The town was formerly celebrated for the manufacture of cloth, and some of the brasses in the church are to the memory of wealthy clothiers.

The church, St. Mary, is a most interesting building, containing chancel, nave, aisles, north and south porches, and a fine tower, in which hang two Mediaeval and three later bells. It chiefly belongs to the Early English period, and there is a beautiful Early English font, and a Norman chancel arch with remains of frescoes. In the church are many fine examples of carved oak, of which one example is given.

The early registers were destroyed by fire, but amongst the charities, of which there are several, is a bequest of 154 acres of fenland for the use of the poor, to dig turf for fuel.

A sketch of the font is enclosed, and it will be seen to be of a very interesting character.

JOHN S. CORDER.

#### Books.

*Archæological Survey of Egypt: El Bersheh.* Part I. By PERCY E. NEWBERRY. Egypt Exploration Fund Offices, London; also Kegan Paul, Trench, Trübner & Co.; B. Quaritch; and A. Asher & Co.: London.

THIS volume of the valuable publications of the Egypt Exploration Fund is occupied with the Tomb of Tehuti-hetep at El Bersheh, and includes also plan and measurements of the tomb by Mr. G. Willoughby Fraser, F.S.A. The tomb itself, architecturally speaking, is of the same type with a good many others in Egypt. It is described in the book as being the finest and most interesting of the ten inscribed tombs of the Middle Kingdom at El Bersheh. Like a great many others, it consists of a façade with two columns supporting an imitation beam or lintel cut out of the rock, with a large chamber in the rear entered by a door facing the centre intercolumniation of the façade. There are no columns in the interior chamber, the roof of which is flat, and not curved as found in many other examples that have been previously illustrated in this series of publications and elsewhere. The two columns of the façade, of one of which a large scale drawing is given on a separate plate, have the leaf capital of the well-known Egyptian type, but in a somewhat elongated form, both in regard to its own proportions and its proportionate relation to the length of the column, the whole shaft (below the amulets) being only two and a half times the length of the capital. The shaft is circular, but the capital octagonal on plan, springing awkwardly enough from the circular amulets. Altogether the architectural interest of this tomb is very slight, and we cannot at all concur in Mr. Newberry's suggestion that "the façade before its collapse" (it was damaged by an earthquake) "must have presented an imposing architectural front"; especially considering that the columns and architrave, according to his account, "were coloured pink and marbled with pale green to represent rose-granite." Why this kind of sham, which is denounced as vulgar in the present day, should be condoned when the Egyptians did it, we cannot understand; it was, to our mind, as bad then as it is now. The inscriptions and paintings are of considerable archaeological interest. The inscriptions were made also to contribute to the decoration of the interior, being incised and painted green. The ceiling of the portico was painted up to the edges "with yellow quatrefoils on a blue ground"; according to the sketch given, "quatrefoils" is hardly the right word; they are four-petaled flowers in a cross form. A great many of the paintings represent hunting and fishing, &c., indicating that Tehuti-hetep was a monarch of sporting tastes.

We do not understand the observation that "the shrine is practically uninjured as far as architectural features are concerned," because there are absolutely no architectural features; it is an oblong room with plain walls and a flat ceiling. There seems rather a tendency to exaggerate in describing remains of this kind.

*La Machinerie Théâtrale: Trucs et Décors.* Par GEORGES MOYNET, architecte. Paris: La Librairie Illustrée.

THIS is an extremely amusing book; and that, we fancy, is the light in which the author himself regards it. He undertakes to give an explanation, at great length and with many illustrations and diagrams, of the means whereby stage effects are produced, especially those which are required in that class of drama in which spectacular effect and the production of surprising and unexpected appearances and disappearances of the stage personages are the main objects. The author's tone is, in general, too jocular to allow us to believe that he is very much in earnest about stage-craft. Thus we have a chapter on "Gloires, Vols, et Apothéoses," commencing with the statement that "Une pièce féerique que se respecte ne va pas sans deux ou trois apothéoses, et souvent plus;" and he proceeds to show the reader "how it is done;" and so on in regard to other branches of the subject. The general impression left on the reader is that the most literal translations of "Trucs" is, or ought to be, "Tricks." We do not think any theatre architect would find the book of much value as a guide to stage construction. But it is full of entertainment, and will be of great interest to that large portion of the

public to whom scenic effect is the chief attraction at a theatre.

*An Old Kirk Chronicle: Being a History of Auldham, Tynninghame, and Whitebirk, in East Lothian.* From Session Records. By the Rev. P. H. WADELL, B.D. Edinburgh: W. Blackwood & Sons.

THE author states that this book has been written for the sake of the past and from a sense of duty; so much in the history of parish churches in Scotland having been lost, he thinks it a duty of every parish minister to put on record all the information he can collect as to the history of his parish and its church. We are entirely in agreement with him, and only wish that more parish ministers would endeavour to emulate the author in thus contributing to history. At the same time we must observe that the history here recorded is more general history than what is more specifically called archaeological; still less is it architectural. There are however photographs of the churches, both interior and exterior, and of some simple but interesting specimens of old church-plate. There are no plans, which from the archaeological and architectural point of view is a fatal error. The book contains much interesting and characteristic parish history, but not of a kind into which we can enter here.

*Sussex Archaeological Collections: Vol. XXXIX.* Lewes: Farncombe & Co. 1894.

THE most interesting item to us in the thirty-ninth volume issued by the Sussex Archaeological Society, is the paper by Mr. André on "The Chancel Screens of Parish Churches," illustrated chiefly by Sussex examples. The paper gives a brief sketch of the origin and history of chancel screens generally, with a good many particulars about special examples, and a list, not professing to be quite complete, of chancel or rood screens in Sussex churches. Mr. Mitchell-Whitely contributes a short note on "Recent Finds of Pottery at Eastbourne," and Mr. Inderville, Q.C., a longer one on Rye under the Commonweal; and Mr. W. F. Martin a communication on the rebuilding of Ringmer Church Tower, accompanied by a plan. The volume contains a great deal of subsidiary information in regard to local and family history, &c.

*A Text-book of Mechanics and Hydrostatics.* By HERBERT HANCOCK, M.A. London: Samson, Low, Marston, & Co. 1894.

THIS book is the embodiment of a series of notes which the author had written for his own use when lecturing on this subject. He has now so arranged them that by the help of copious illustrative examples and diagrams taken from common objects, the student may be able to master the fundamental principles upon which a knowledge of mechanics and hydrostatics is based.

In order that those who have not hitherto acquired much knowledge of mathematics may have some tools to work with, Mr. Hancock has explained the method of measuring angles, and the geometrical meanings of the terms used in plane trigonometry; and throughout the book he has described each portion of this subject in so simple a manner that there should be no difficulty in obtaining a very useful knowledge of these sciences.

The author has attached to each chapter a large number of questions, the answers to which are given at the end of the book. Many of these questions are taken from the matriculation examinations of the University of London, and those of the Royal Military Academy, Woolwich, and exemplify the kind of problems generally set by the examiners.

*The Slide Rule.* By C. N. PICKWORTH, Wh. Sc. London: Emmott & Co., Ltd., 56 and 57, Fleet-street. 1894.

THE reason why the Gravé slide rule is not used as much as it deserves to be is probably owing to the want of a small practical manual of instruction exemplifying the utility of the instrument.

Such a work, however, has now been supplied by Mr. Pickworth, who explains very clearly the principle of slide-rule computations, and shows how it can be employed by those wishing to take the fullest advantage of its numerous applications in technical calculations of all kinds. The author deals with his subject in a very simple manner, and even those accustomed to use the instrument will be surprised to find the large number of calculations it can be made to perform.



## Correspondence.

To the Editor of THE BUILDER.

## SOUTH SHOEBOURNE CHURCH.

SIR,—May I suggest that the two recesses at the sides of the chancel arch of this church were not originally intended to accommodate altars, but were survivals of a very early ritualistic arrangement, exemplified by the plan of the principal basilica in the Cimetarium Ostrianum, described by De Rossi in "Roma Sotteranea," as of the earliest years of the fourth century? In this basilica in positions corresponding to the two recesses at South Shoeboorne, are two niches, in one of which the sacred books were kept, and in the other the sacred vessels, and all things necessary for the offering of the holy sacrifice; they were, in fact, credence tables, or aumbries.

There are two similar recesses in the church at Castle-Rising, Norfolk; that on the north side retains its semicircular arch, whilst that on the south has in the thirteenth been enriched by a well-moulded pointed arch, and furnished with a piscina, when it was converted into an altar recess.

J. NICHOLL.

\* \* There is a semi-circular addition, like a small apse (showing externally), in the north nave-wall of Gumfreston, two or three miles from Tenby. This may possibly come under the same explanation.—ED.

## HEIGHTS OF FUTURE BUILDINGS IN LONDON NEXT THE STREETS.

SIR,—I should be glad if you would state whether I am correct in my reading of Sections 47 and 49 of the new London Building Act, 1894; and I have no doubt that many others would also like to have your opinion, as this is a matter affecting so many people who contemplate pulling down old buildings and erecting new ones. This, of course, did not come into the plan of your very able analysis of the Act, which was read with so much interest.

1. In a street over 50 ft. wide the new building may be 80 ft. high, and two stories may also be put in the roof.

2. In a street less than 50 ft. wide, formed or laid out after August 7, 1862, the new building may be as high as the width of the street, and may have two stories also in the roof.

3. In a street less than 50 ft. wide, formed before August 7, 1862, the new building may be as high as the width of the street, and may have also two stories in the roof; but if the old building on the site is higher than the width of the street, the new building may be carried to the same height as the old building.

"AN ARCHITECT."

\* \* Our correspondent is right in paragraphs 1 and 2 of his letter, but not in No. 3, as the whole paragraph is correct for a street formed or laid out after August 7, 1862 (i.e., for the present moment), and the words "before August 7, 1862" should be struck out of his paragraph. It will then be correct for the new Act, though it would be more accurate to say, "if the old building on the site was higher, &c., instead of 'is.' The case may be put more plainly as follows:—

1. In a street less than 50 ft. wide formed since August 7, 1862, the measure of height of a new building is limited to the measure of width of the street, and an existing building cannot be added to so as to exceed that limit. But if an existing building, which was higher than that limit before the "commencement" of the new Act (i.e., before January 1, 1895) is pulled down, the new building on the same site may be erected to the same height as the old one which it replaces.

2. In the case of a street less than 50 ft. wide formed before August 7, 1862, the consideration of the width of the street does not operate at all, and the height of a new building is only limited by the general limit of height fixed by the new Act (i.e., 80 ft.); with the exception that if the new building replaces an old one of greater height than 80 ft., it may be carried to the same height as the old one. This is a very undesirable state of things; but that is unquestionably the interpretation of the wording of the new Act.—ED.

## A MACHINE FOR CRUSHING SHINGLE.

SIR,—Could any of your readers inform me if there is a machine in existence for crushing shingle into sand for stone-sawing purposes? If so, I should like to know where it could be obtained.

F. E. STEPHENS.

## COMPETITIONS.

MUNICIPAL BUILDINGS, KING'S LYNN.—The result of the competition for municipal buildings at King's Lynn has just been made known. The first premiated design is by Messrs. Tree & Prie, 70, Warwick-road, Earl's Court, London; the second being by Mr. G. Sedger, 26, Great James-street, Bedford-row.

## PRIVATE BILLS—SESSION 1895; AND BOARD OF TRADE PROVISIONAL ORDERS.

It is stated that the plans and books of reference deposited last month in the Private Bill Office relate to 189 undertakings, of which about 50 are for railways, 65 for gas and water (principally), and 30 for electric lighting. We give an abstract of the more important projects.

**Railways.**—Metropolitan District—Revival of powers and extension of time to complete the Acton Junction line, under their Act of 1878, South-Eastern—Further lands at London Bridge Station for their suburban traffic. City and South London—Extension of time under the Acts of 1890-3 and an additional approach beneath Arthur-street east to King William-street Station, London, Walthamstow, and Epping Forest.—To alter and deviate from authorised lines in Hackney, Newington, Clapton, Walthamstow, Leyton, and Tottenham. Metropolitan and Outer Circle.—To abandon and annul their Act of 1888. Extension of time for completing the electric railway-line from the City to Finsbury Park, Latimer-road and Acton; extension of time to Manchester, Sheffield, & Lincolnshire—very numerous powers, comprising new lines in the counties of Nottingham, Lincoln, and Middlesex, and in London, deviations from their lines authorised by their "Extension to London" Act, 1893, and a line from the Metropolitan Railway at Preston-lane, near Harrow, through Kingsbury, to Willesden.

The system of this railway forms a network of lines, reaching from Liverpool, Chester, and Wrexham, to Hull, Grimsby, and Lincoln, with branches, not yet completed, to Southport, Preston, and Blackpool, and to Leeds, Halifax, Bradford, Wakefield, Huddersfield, Mansfield, and Derby. To Sir E. Watkin is mainly due the extension to London. It begins nine miles north from Nottingham, at Annesley, sung by Byron, for it was Mary Chaworth's home. Thence by Hucknall Torkard, near Wollaton, through Nottingham by Clifton, commemorated by Kirke White, where they point out the poet's favourite avenue, and so to Gotham, Loughborough, past Charnwood Forest, on to Leicester. It then goes on by Lutterworth, where Wycliffe was rector during the last nine years of his life to Rugby, and then through Northamptonshire into Buckingham, to join the Metropolitan line at Quainton-road, six miles north from Aylesbury. From that town running-powers will be exercised to Wendover, Great Missenden, Amersham, Rickmansworth, and Harrow, to Willesden Green. Thence a new branch will be made to traverse West and South Hampstead and St. John's Wood, ending in a terminus at Marylebone-road, east of Lisson Grove. Large areas are taken for sidings, &c., at Neasden, and for goods and coal in Marylebone. Thus will be cleared away Harwood and Blandford-squares, and with them two homes of "George Eliot," also nearly all the houses and their gardens in the quarter lying south of the eastern portion of St. John's Wood-road. A line from Uxbridge terminus, Great Western Railway, by Denham, where Sir Humphrey Davy loved to fish, Moor Hall, and Harefield Mills (where, they say, was cast the copper ball of St. Paul's), to West Hyde and Springwell, whence two branches will extend to the Metropolitan and London and North-Western stations at Rickmansworth. The line passes for about nine miles through the Colne Valley and Harefield parish—familiar to Milton, who, when living in Horton, often visited at Harefield Place, and wrote his "Arcades" for performance there by the grandchildren of Alice, Countess Dowager of Derby, who bought Harefield in 1601, soon after her marriage to the Lord Keeper, Sir Thomas Egerton. He refers to these places in "Arcades" and "Epitaphium Damonis." London and South-Western—New line from Stratton, with a branch to Bude, through Marhamchurch, Poundstock, Bridgerule, and Pyworthy, to their branch at Holsworthy (fourteen miles distant); widening of main line at and between Worthing and Basingstoke, and to take additional lands at various places in London, the suburbs, and provinces, including a small plot of the New Forest at Eling. Stroud railway from the Great Western and Midland at Stroud to Painswick and Cranham, through South Rodborough and Whiteshill (six miles). Liskeard and Looe Union Canal—Lines from their railway to Liskeard Station (Great Western Railway). Hayes and Farnborough—For dissolution and re-incorporation, and a new line (about four miles) from Bromley Station, London, to Chatham and Dover Railway, by Hayes, Barnet Wood, and Sevenoaks Road, to Locksbottom at Farnborough. Lynton and Barnstaple—A new line between those places, fifteen miles distant. Great Eastern—A line, in the Isle of Ely, from Whittlesey St. Mary to Benwick, six miles distant, and a quay on the river at Benwick. Great Western—New lines and widenings in Monmouth and Glamorgan, and similar minor works in the western portions of their system. A new company—For a line from West Buckland, Devon and Somerset Railway, to Lynton, thirteen miles distant. Isle of Wight Central—A line from Ashy, Ryde, to Horringford, near Arretton, joining their Ryde and

Newport, and Newport and Sandown branches (six miles). Great Northern—New lines at Peterborough, Nottingham, Basford, and Manchester, with the widening of their Hitchin to Arlesey, Helpline to Essendine, Little Bytham to Corby, and East Markham to Gamston lines. Yorkshire Dales—several lines in the West and North Ridings. East Denbighshire—Railways to connect Wrexham and Rhoslanerchrugog, and with the Pontcysyllte line of the Shropshire Union Railways and Canal Company in Wrexham. Tenterden—Lines from Boxley through Maidstone, Loose, East Farleigh, Boughton Monchelsea, to Headcorn (about thirteen miles); from Headcorn through Frittenden, Biddenden, to Tenterden (several miles distant); and from Tenterden through Woodchurch, and Kennardington, to Appledore, and Snargate on Ashford and Rye line (six miles distant). Torrington and Oakhampton—A line through Great and Little Torrington, Langtree, Petockstow, Meeth, Exbourne, and Sampford Courtenay to Oakhampton (seventeen miles distant); which will appropriate an aggregate of twenty-five acres of common land mostly at Hatberleigh and Great Torrington. Caledonian—To take over the Solway Junction Railway undertaking. South-Eastern—To purchase the Lydd Railway.

**Municipal.**—Brighouse Corporation—Various powers; to bill will seek for powers "to require street musicians to deposit a sum requested," and "to impose penalties on occupiers refusing to give names of owners." Croydon Corporation—For a Watch Committee, a separate police force and exclusion from the Metropolitan Police District. Bristol Corporation—extension of city boundaries, by including Shirehampton, Herfield, Stapleton, Kingswood, and Saint George parishes, with Dunball Island, and parts of Brislington, Bedminster, Ashton, Henbury, Westbury, and Mansfield. Folkestone Corporation—Boundaries to include Cheriton and Sandgate for all municipal and sanitary purposes. Blackpool Corporation—New roads and extension of limit to take in all Bisham with Cornick and the adjacent sea-shore. Liverpool—A company to take over the New Cattle Market Company's undertaking and new works for the same, including railway lines, subways, &c., in Bootle township. Kingston-on-Hull Corporation—For a variety of powers, comprising an extension of limits; a site in Scolcoates for new public municipal buildings, with central library and technical instruction schools; to prohibit the erection or continuance of sky-signs, and to regulate street advertising and the use of vehicles for displaying advertisements in the streets; a crematory in the Western Cemetery; and to "prohibit the constructing or fixing of any projection or advertisement hoarding or other hoarding over any street, or so as to allow any suspended load to hang over the surface of the street" without their consent. Local improvements at Wood Green, Tottenham—To include the creation of baths, washhouses, and artisans' dwellings, and widening of Station-road and the main road. To divide St. Paul's, Deptford, with Hatcham, from the Greenwich District, to set up a separate vestry therefor, and to provide that the said District shall consist of only the parishes of St. Nicholas, Deptford and Greenwich. To amend the Vestminster (Parliament-street) Improvements Act, 1862, reviving certain powers under the original Act of 1867, for the compulsory purchase of the Great George-street site, and abandon the two new streets authorised by the latter Act.

**Tramways.**—Leeds Corporation—New lines. London Street Tramways—To abandon the Archway-road line, and for relief from obligation to contribute to the cost of reconstructing Highgate Archway; and lease tramways from the London County Council or the Local Authority of any district adjoining the County of London. London, Deptford, and Greenwich Co.—New tramways in Tooley-street and Parker's-row.

**Cas.**—British Gas Light Co. (Staffordshire Pottery)—Additional capital for their works at Etruria and Brownhills in Burslem. The Middlesex Gas Co.—For dissolution and re-incorporation, and new works for extended supply in Hendon and Finchley. A joint Board for Mytholmroyd and Hebden Bridge, Yorks. W.R., Local Boards, the latter to take over the Hebdon Bridge Gas Co.'s works. Brighouse Corporation—To purchase the Rastrick Gas Co.'s undertaking. South Metropolitan—To convert their capital into stock bearing a uniform lower standard of dividend, and for representation in the management of stock-holders in their employ.

**Water.**—Barnsley Corporation—New works and reservoir in Ecclesfield, to be made by embanking the Haggbrook valley. Merbury—Tydfil Local Board—A new reservoir in Llanfyrnach, by a dam across the upper portion of the Fyfe Fechan, the reservoir to extend up the river for about 33 chains. Rotherham Corporation—New works, and for further time to complete the Dalton reservoir. Lambeth—To raise not more than 500,000. additional capital, and two additional reservoirs, and enlargement of those now at West Molesey. Croydon Corporation—To acquire plant, machinery, rights, &c., from the last-named company for supplying the South Norwood, Upper Norwood, and West Wards. Bridlington and Quay Water Co.—For dissolution, and re-incorporation as the Bridlington Water Co.



A company to supply Cranbrook, Goudhurst, and Hawkhurst, in Kent.

**Canals, Harbours, Docks, &c.**—Thames and Severn Canal Navigation Company—To sell their undertaking to a fresh corporate body, consisting of the "allied navigations," being representatives of various local enterprises, the County Councils of Gloucester, Wiltshire, and Berkshire, the Thames Conservancy Board, and others. Mersey Docks and Harbour Board—New pier from the Alfred Dock, with floating landing-stage and bridges to the river-wall. Swansea Harbour Trustees—A swing-bridge to replace the draw-bridge across New Cut, with a lock or half-tide basin by the existing north dock. Sutton Harbour Improvement Company—A quay, to be called the Coxside Quay, 750 ft. long, and to deepen Sutton Pool Harbour, Plymouth. Fortishead—To widen and to lengthen, by about 560 yds., the present pier, in the Bristol Channel. A sea-wall at Dover, from the end of East Cliff-terrace, to Ness Point, St. Margaret-at-Cliffe. Brading Harbour and Railway—Several new works, to include a fresh channel from the "Ferry" Inn to the sea. To appoint Commissioners to construct drainage, outfall, and incidental works, in respect of the Fender Valley drainage.

**Provisional Orders.**—Notice is given of intention to apply to the Board of Trade for provisional orders as follows:—*Electric Light and Electricity*—Production, storage, and supply of light, or light and energy and power, by the Corporations of Winchester, New Windsor, Luton, Borth, and Carlisle; the Local Boards of Walthamstow, Alderley Edge, Cheshire, Swinley, New Town, St. George, Gloucester, Radcliffe, Lancashire, and Leigh (Lancashire Urban Sanitary Authority); by the following electric-light or power companies—County of London and Brush Provincial, to supply St. Olave's, St. Mary, Battersea, St. Mary, Newington, and Devonport; Fendernere and District, in Grasmere; Ambleside, Bowness, Kendal, Ulverston, and Grange; Pontypool, within the Local Government Board District; Liverpool; Bath City; Charing Cross and Strand, within the Strand District; Salisbury (extended area); Crotty Hill (extended area); Holloway, in Great Crosby, Lancashire; Municipal, in Margate; and British Insulated Wire Company, Prescott, for Prescott, Whiston, Eccleston, Rainhill, and Hingson, Lancashire. *Gas*—Enlarged works and areas by the following gas companies:—Barnstable, Newark (Nottingham), and Felixstowe; and the taking over by the Corporation of St. Ives, Cornwall, the works near the Meadow. *Water*—Works in Hayling Island; Holyhead Water-works Company, enlarge their lower reservoir from 1½ to 4½ acres in area, and to make a new one adjoining, of 2½ acres. *Tramways*—West Hartlepool (new company); from Farnborough to Aldershot, through the North and South Camps, and the General Parade ground; in Great Yarmouth, with cars that can run on or off rails; Carlisle and district, new lines in Stanwix. St. Mary's and St. Cuthbert's; Newcastle-on-Tyne Corporation, to extend to their system powers for moving the cars by wire or other ropes; City of Gloucester, new lines in the city, and in Hempstead, Tuffley, and Upton; London United—new lines in Hammer-smith and Acton. *Harbours and Piers*—To appoint Commissioners to superintend, manage, and maintain of Cowes Harbour, to lengthen, by about 600 ft., the stone pier at Swanage, by the Swanage Pier Company; a new wharf and wall in the Camber, by the Portsmouth Corporation; a pier, about 150 yds., of piles, at Woody Bay, near Marton, Devon, by Mr. B. G. Lake, or a company; and a pier, 230 yds. with new harbour wall and landing-slip, at Minehead, Mr. G. F. Luttrell, of Dunster Castle, being "promoter" thereof.

**ARCHITECTS' ORDER FORMS.**—This is a book of printed forms and counterfoils for giving orders for extras on a contract, and keeping a record of them, it is uniform with the book of "Certificate Forms" noticed in a previous number, and is issued by the same publisher (E. W. Savory, Cirencester).

**A POCKET "READY-RECKONER."**—The "Thumb Ready-Reckoner" (Oxford University Press) is a little volume of 2 in. square giving the amount of every sum, from 1 of a penny to 100. 6d. when multiplied by numbers from 1 to 100. It contains also interest tables, and weights and measures and metric tables.

**PULPIT, STARCROSS PARISH CHURCH, DEVONSHIRE.**—The parish church at Starcross, dedicated to St. Paul, was recently re-opened, after restoration from the designs of Messrs. Rowell & Son, architects, of Newton Abbot. At that time a memorial pulpit from these gentlemen's plans was promised by a former resident of Starcross, and the work has now been carried out. It is octagonal in plan, the interior of the rostrum being gained by the preacher by a flight of six steps. It is made entirely of English oak. The base is moulded, and the upper portion has recessed panels on each of its seven sides. These are traced and carved at top and bottom, and the whole structure is surmounted by a moulded and carved cornice. Messrs. Harry Fens & Sons, Exeter, have carried out the work.

## The Student's Column.

### DETAILS OF RURAL WATER SUPPLY.—XXVI.

PUBLIC INQUIRIES.—(conclusion).

**IN** the preliminary chapter of this series it was stated that the money for carrying out waterworks by Local Authorities is usually obtained upon loan after a Local Government Board inquiry.

The Public Health Act, 1875, sec. 293, empowers the Local Government Board to cause to be made from time to time "such inquiries as are directed by this Act, and such inquiries as they see fit in relation to any matters concerning the public health in any place, or any matter with respect to which their sanction, approval, or consent is required by this Act."

The principal matters connected with the supply of water to rural districts upon which public inquiries are held, are:—

1. The borrowing of money beyond a certain amount.
2. The carrying of water-mains without the district.
3. The purchase of lands otherwise than by agreement.
4. The formation of a special drainage district for purposes of water supply.
5. The construction of large reservoirs.

The Public Health Act, 1875, sec. 295, states that "all orders made by the Local Government Board in pursuance of this Act shall be binding and conclusive in respect of the matters to which they refer, and shall be published in such manner as the Board may direct."

Sec. 296 empowers Inspectors of the Local Government Board "for the purposes of any inquiry directed by the Board (to) have in relation to witnesses and their examination, the production of papers and accounts, and the inspection of places and matters required to be inspected, similar powers to those which Poor Law Inspectors have under the Acts relating to the relief of the poor for the purposes of those Acts."

#### 1.—The Borrowing of Money.

By Secs. 233, 234, Local Authorities are empowered, with the sanction of the Local Government Board, to borrow money for "permanent works" (e.g., waterworks), and for such purpose they may "mortgage to the person by or on behalf of whom such sums are advanced any funds or rates out of which they are authorised to defray expenses incurred by them in the execution of this Act." In the case of a Rural Authority the cost of providing a supply of water to any contributory place within the district (e.g., parish) is by Sec. 229, a special expense, and only the rate or rates out of which such expenses are payable may be mortgaged for that purpose.

The total amount of the loans outstanding is not at any time to exceed the "assessable" value for two years of the premises assessable within the district in respect of which such money may be borrowed. By "assessable" must be understood "rateable" in this connexion.

Where the sum proposed to be borrowed, together with the balances of outstanding loans (if any), would exceed the assessable value for one year of such premises, the Local Government Board shall not give their sanction to such loan until one of their inspectors has held a local inquiry and reported to the said Board.

The loan is usually obtained from the "Public Works Loan Commissioners," on the recommendation of the Local Government Board. It must be remembered that the Local Government Board can only recommend, and cannot compel.

#### 2.—The Carrying of Water-Mains Without the District.

Sec. 32 requires a Local Authority before commencing the construction or extension (sec. 54) of any water-main without the district, to give three months' notice by advertisement in one or more of the local newspapers circulated within the district where the work is to be made. Such notice is to describe the nature of the intended work, and shall state the intended termini thereof, and the names of the parishes, and the turnpike roads and streets, and other lands (if any) through, across, under, or on which the work is to be made, and shall name a place where a plan of the intended work is open for inspection at all reasonable hours; and a copy of such notice shall be served on the owners or reputed owners, lessees or reputed lessees, and occupiers of the said lands, and on the overseers of such parishes, and on the trustees, surveyors of highways, or other persons having the care of such roads or streets.

Sec. 33 is to the effect that if any objection

is raised against the intended works the said works must not be commenced without the sanction of the Local Government Board.

Sec. 34: "The Local Government Board may, on application of the Local Authority, appoint an inspector to make inquiry on the spot into the propriety of the intended work and into the objections thereto, and to report to the Local Government Board on the matters with respect to which such inquiry was directed, and on receiving the report of such inspector the Local Government Board may make an order disallowing or allowing, with such modifications (if any) as they may deem necessary, the intended work."

Sec. 285 provides that "any Local Authority may, with the consent of the Local Authority of any adjoining district, execute and do in such adjoining district all or any of such works and things as they may execute and do within their own district, and on such terms as to payment or otherwise as may be agreed on between them and the Local Authority of the adjoining district."

An important issue has arisen in connexion with the two last clauses, which is clearly set forth in the following extract from the *Justice of the Peace* for May 19, 1894, which applies equally to water-mains (Sec. 54):—

"Query:—(2). If one Authority desires to carry a sewer through land of an adjoining Authority, will it be sufficient to comply with Sec. 32, or will it be necessary to obtain the consent mentioned in Sec. 285?"

(3). If such consent is necessary, can it be arbitrarily withheld by the adjoining Authority?

Answer:—(2). We think the consent of the adjoining Authority must be obtained. Such consent is a condition precedent to the works being undertaken.

(3). If the consent is withheld there is no power of compelling the consent to be given. It is, therefore, immaterial whether or not the consent is arbitrarily withheld, as such consent is necessary before undertaking the works."

#### 3.—The Purchase of Land otherwise than by Agreement.

A Local Authority after having complied with the requirements of sec. 176 (sub-sec. 2), with regard to publication and the service of notices, may petition the Local Government Board to permit them to put into force the Lands Clauses Consolidation Acts. After receiving such petition, and being satisfied that the necessary formalities as to publication and service of notices have been complied with, the Local Government Board may either dismiss the petition or institute an inquiry. After such inquiry the Local Government Board may grant the petition, with such modifications or conditions that the Board may think fit.

#### 4.—The Formation of Special Drainage Districts.

As stated in chap. i., the Local Government Board are rarely in favour of this step for purposes of water supply alone.

#### 5.—The Construction of Large Reservoirs.

This refers only to reservoirs other than service reservoirs or tanks which will hold not more than 100,000 gallons, and therefore rarely applies to questions of rural water-supply. The Local Authority is required to properly advertise the proposed work in the local newspapers, and if any person who would be affected by the intended work lodges an objection, the Local Authority may appeal to the Local Government Board. After receiving such appeal the Local Government Board may institute an inquiry, after which they may make an order disallowing or allowing, with such modifications (if any) as they may deem necessary, the intended work.

Where a Local Authority make default (*inter alia*) in providing their district with a supply of water (sec. 299), and complaint is made to the Local Government Board, the Local Government Board, "if satisfied, after due inquiry, that the authority has been guilty of the alleged default, shall make an order limiting a time for the performance of their duty in the matter of such complaint. If such duty is not performed by the time limited in the order, such order may be enforced by writ of mandamus, or the Local Government Board may appoint some person to perform such duty." Similar powers are now given by the Local Government Act, 1894, sec. 16, to County Councils upon the complaint of Parish Councils.

Before holding an inquiry the Local Government Board require to be supplied with certain information in the form of statistics, plans, estimates, and details. The requirements of the Local Government Board as to plans have already been dealt with in chap. xi. The remaining information has to be supplied upon forms issued



for the purpose by the Local Government Board, which are filled up by the clerk or engineer, according to the nature of the queries.

The appended form has to be filled up by the engineer of the proposed works :—  
WORKS OF WATER SUPPLY.—ESTIMATES AND DETAILS.

Name of Sanitary Authority.....  
In the case of a Rural Sanitary Authority,  
name of contributory place for which the works  
are required.....

[illegible]

N.B.—Describe the sluice-valves, fire-cocks and hydrants, and state if or not the valves, or any portion of them, are to be of gun-metal.  
Describe the casings and street fittings in detail.

Furnish diagrams if they have been prepared.

*Details of the Works.*

Nos. Headings for a Detailed Description of the Works  
to be furnished by the Engineer.

- ### *Pumping Works.*
- 1 Sort of engine proposed.
  - 2 Estimated power of engine.
  - 3 Estimated weight of coal per hour, per h-p.
  - 4 Volume of water to be lifted.
  - 5 Head to which water is to be lifted.
  - 6 Internal diameter of rising main in inches.
  - 7 Calculated velocity of water in feet per second, and the rising main.
- ### *Storage Reservoir.*
- 1 Area of gathering ground, in acres.
  - 2 Average annual depth of rainfall.
  - 3 Surface area of reservoir when full, in acres.
  - 4 Greatest depth of water in the reservoir when full, in feet.
  - 5 Total volume when full, in gallons.
  - 6 Length of by-wash.
  - 7 Height of the embankment above top water-level, and top width and thickness of the puddle-wall at bottom and at top.
- ### *Covered Service Reservoir.*
- 1 Area of reservoir in square yards.
  - 2 Depth of water in reservoir when full, in feet.
  - 3 Volume of water in reservoir when full, in gallons.

N.B.—Describe in writing the proposed mode of construction of covered reservoirs; as, also, how the reservoir is to be ventilated, lighted, and worked.

It is not desirable to make the pumping main a supply main also, nor should the velocity through any pumping main exceed 2 ft. per second.

The whole of the cast-iron pipes and other castings must be varnished.

Plans and sections, or tracings of them, together with details, must be furnished.

[illegible]

N.B.—This form should be signed by the engineer of the proposed works.

At the inquiry the engineer is called upon to describe and explain the proposed works, and is frequently subjected to a sharp cross-examination upon the details. It is therefore necessary that he should be fully prepared upon every point, and have his notes in such a form as to be ready for reference at a moment's notice. A useful method is to use a note-book with an alphabetical margin, and to arrange the various matters alphabetically. This practice will be found simple and rapid. Another useful practice is to lay down the mains and branches upon a plan, or ordnance map, indicating the positions of reservoirs, tanks, sluice-valves, hydrants, &c., and distinguishing by means of different colours the ownership of all lands built upon, passed through, or in any way affected by the intended works.

In conclusion we would urge upon the student the necessity for careful thought and preparation before advancing any scheme for water supply. The details comprehended in the profession of a waterworks engineer are innumerable, but upon the full appreciation of these details will depend his success or failure. A small scheme requires, in its way, as much preparation as a large one, and an error in calculation, which in the latter would be insignificant, might be the ruin of the former.

The habits of careful investigation, unerring accuracy, and steady perseverance, combined with a thorough practical knowledge, are qualifications which alone will lead to the execution of those works with which the engineer may afterwards be proud to hear his name associated.

## GENERAL BUILDING NEWS.

**CONGREGATIONAL CHURCH, CARDIFF.**—A new Congregational Church is in course of erection for the members of Roath-road Congregational Church, Cardiff, in Stacy-road. The buildings will face Oakfield-street, and will provide accommodation for over 60 worshippers, with vestries, class-rooms, and a school or hall in the rear. Mr. John Styles, of Canton, Cardiff, was the contractor. The architects were Messrs. T. Waring & Son, of Cardiff.

**EXTENSION OF GLASGOW POST OFFICE.**—A new building in Ingram-street, Glasgow, have just been completed for the Glasgow Post Office. It is a building of three stories, 120 ft. by 77 ft. Provision is made on the ground floor for additional sorting and delivery space, and for the carriers' sorting department on the first floor, and the telegraph office will be occupied later on as the telegraph instrument room. One of the first buildings in the city to adopt electric lighting, the current in the post-office is obtained from the city supply station. Owing to the large additional supply of current required in the new building, the question of laying down the generating plant for the electric lighting of the whole building was at early stage considered by the Post Office authorities, and the estimates were prepared by Mr. W. H. Prece, C.B., F.R.S., the Engineer-in-chief to the Department, which showed that a large saving would be effected by following that course. The work of carrying out Mr. Prece's specifications has now been completed. The new plant is being installed in the basement of the new block. All the work has been carried out under the supervision of Mr. E. Ashton, superintending engineer of telegraphs for the western

district of Scotland. Mr. E. W. Rees was clerk of works.

**PROUDFOOT INSTITUTE, MOFFAT, LANARK-SHIRE.**—On the 10th inst. the Proudfoot Institute, situated in Mansfield-place, Moffat, was opened. The institute consists of on the ground-floor refreshment, smoking, and billiard rooms, with a large recreation hall behind. Upstairs are the reading-hall, library, committee, and game rooms. The building is in the Renaissance style. Mr. Alan B. Crombie, Dumfries, was the architect.

PROPOSED PUBLIC BATHS, GREENOCK.—On the 28th inst., at the meeting of the Greenock Police Board, the Master of Works submitted sketch plans prepared by Mr. Stewart, architect, showing how the site of the vacant ground at 55, 57, and 59, Main-street, extending to over 1,000 square yds., might be utilised for the erection of two swimming-baths and relative adjuncts. He estimated the probable cost of a two-story building, including about twenty private baths and gallery for visitors, at about 7,000*l*. If the building were made only one story and the private baths dispensed with the probable cost would be about 5,000*l*.

EDINBURGH NEW DENTAL HOSPITAL.—The new premises of the Edinburgh Dental Hospital and School in Chambers-street were inaugurated by the Lord Provost recently. The premises have been entirely remodelled internally and fitted up for the work of the hospital and school. In the basement stairs cloak-room and lavatories are provided, and a new room for the use of the dental students with back and front furnace and the various fittings necessary for the mechanical work. The laboratory is 44 ft. long by 22 ft. wide, and is lined with tiles to a height of 6 ft. On the ground floor are the anæsthetic and recovery rooms; also the board and lecture rooms, with professor's cloak-room. On the first floor is the extracting-room and waiting-room for patients; whilst two rooms on this floor are occupied by the Eye Dispensary. In one of these there exists some mural decoration, supposed to have been executed during Lord Glenlee's occupation of the house—by a French artist, together with one of the Runcimans, who probably executed the figure work. The festoons and decorative work were executed by the present Mr. Thomas Bonnar's grandfather. The stopping-room occupies the whole of the second floor, which has been completely reconstructed to give additional height and top lights, and accommodation being provided for thirty-one operators. Over the back portion of the stopping-room a caretaker's house is provided. The building has been fitted throughout with apparatus for the electric-light, and is heated with hot water, the furnace-room being placed in the basement. There is also telephonic communication with the city. The whole of the work has been carried out from plans by Messrs. Frank W. Simon & Tweedie, architects, Edinburgh, and have cost about 2,000*l*.

**THE FREE CHURCH, SHERBROOKE, GLASGOW.**—The memorial stone of Sherbrooke Free Church which has just been laid by Mr. James Campbell, of Tullichewan. The walls are built in low courses of clean-cut rubble, all the dressings being tooled; the roof covered with green Westmoreland slates and red tile ridge. The hall was accommodate 250 persons, the height of the roof being 25 ft. broad and 12 ft. deep. The south gable window is in three divisions, having moulded shafts and carved capitals supporting deeply-moulded tracery. The side windows are three lights in each bay, and all the windows are 8 ft. above the floor. The entrance porch is at the south-east, the floor being laid with Dumfries red pavement. The seats are of oak, open-backed. The pulpit is of the same material, and the north is the vestry, session-room, and church-officer's house. The building will be enclosed with a wrought-iron gate and railing. The total cost, including furnishings, will be about 2,800*l.* The contractors for the building are:—Mason and joiner work, Alexander Eddie & Son, Glasgow; slater-work, J. M. Ount & Son, Glasgow; plumber-work, William Brown, Glasgow; and painter-work, James Brown, Glasgow. The slater-work, the Scottish National Glass Company. Mr. W. F. Mc Gibbon, of Glasgow, was the architect.

The Institute at Penicuik, erected in terms of a bequest by the late Alexander Cowan, was opened on the 22nd inst. It is built of red freestone from the Moat Quarry, near Carlisle, and is in Scottish baronial style. Covering a total area of 5,320 ft., it includes a hall giving accommodation for 700 persons, a library, gymnasium, billiard-room, chess-room, with retiring-rooms, and janitor's house. It was built to the plans of Mr. Campbell Douglas, architect, Edinburgh, supervised by Mr. James Tait, Edinburgh, by Mr. James Tait, Penicuik, whilst the wood-work was constructed by Messrs. Cowan & Allan, Glasgow. The estimated cost of the erection was £4,000.

*SANITARY AND ENGINEERING NEWS.*

**SEWERAGE WORKS AT FELIXSTOWE.**—The ceremony of turning the first sod in connexion with the main sewerage works for the district of Felixstowe and Walton was performed on the 13th inst. Messrs. Shone & Ault have been the consulting



engineers of the Board, while Mr. G. S. Horton, its Surveyor, has been appointed Engineer of the works. They will be done in contracts. Mr. Fred. Bennett, Ipswich, has secured contract 1. The work will now proceed unhindered.

**HEATING AND VENTILATING APPLIANCES, FIRE AND KINROSS ASYLUM.**—On the 14th inst., a party of gentlemen left Cupar Station, on the invitation of Mr. William Key, Glasgow, ventilating and heating engineer, to visit the Fire and Kinross Asylum for the purpose of inspecting the ventilating and heating apparatus in connexion with the extensive addition which has just been made to that institution. At the boiler-house (we quote from the *Life Herald*) are two large boilers, each showing an index of 70 lbs. of steam. These boilers perform the double duty of working the large air-propeller which draws the air into the building, and heating, by means of coils of steam-pipe, the whole air-supply, as well as the water for use in the bath-rooms. Promising notice to the effect for the air, which is placed facing the south, it was seen that the entering air passes through an outer warming coil and then through a screen composed of cocoanut fibre. This screen is always kept in a moist condition, and has the effect of cleansing and humidifying the air. By means of an anemometer, the air passing through this screen can be reduced to the temperature by admitting filtered cold air through bypass doors made for the purpose—the warm and cold air mixing well passing through the air propeller. The party next found themselves in one of the main air-ducts, into which the air is directly propelled. On either side of this passage are the openings of the leading to each room. Secondary warming coils are placed at the bottom of each duct, so that the air to each room may be warmed to any temperature desired. Several of the rooms were thereafter visited, when it was seen that the volume of air entered so as to be directed to the ceiling, the outlet being only a foot or a foot and a-half from the floor. The whole air in the building being under a slight pressure, no air can enter except by the air-propeller. By means of lighted tapes and a handkerchief placed at the inlets and outlets, Mr. Key showed, to the satisfaction of those present, that there was a continuous stream of air passing through the rooms, without draught. In one of the large day-rooms, which is the very eastmost apartment of the building, and which is 400 ft. from the fan, the passage of air and the temperature were found to be quite equal to those in any other room in the building.

**WATERWORKS, TROON, Ayr.**—On the 20th inst., the ceremony of cutting the first sod on the site of the new reservoir, designed to supply the district and harbour of Troon with gravitation water from the Dundonald Hills, was performed. The reservoir is to be constructed in the glen above the farmstead of Colennan, and the catchment area extends pretty well across the face of the Dundonald Hills. The works are expected to cost about 12,000*l.* Mr. W. R. Copland, C.E., is the engineer of the works, and the contractor is Mr. Osborne, of Ayr.

**REBUILDING OF VAUXHALL BRIDGE.**—The London County Council have deposited for next Session the copy of a Bill to empower them to rebuild Vauxhall Bridge upon the site of the existing bridge.—It is proposed that the new bridge be constructed with five openings, the centre span being 155 ft., with a headway of 20 ft. above Trinity high-water. The Bill provides that, prior to the new bridge being commenced, a temporary bridge should be constructed over the Thames immediately opposite the buildings of the New British Gallery now in course of erection. The time sought within which to complete the new bridge is seven years from the passing of the Act; and for the construction of the whole of the works the Council ask for power to expend 484,000*l.* out of the capital account.

## FOREIGN AND COLONIAL.

**FRANCE.**—The jury of the École des Beaux-Arts have awarded the diploma of architecte to MM. F. Arnaud, Garras, Perraud, Letrosne, Faguer, Hébrard, Proy, Iajioie, and Théophile I. eclece.—M. Umdenstock, pupil of M. Guadet, has obtained the Saint Agnan-Bourcher prize, awarded to the architectural student of the École des Beaux-Arts who has obtained the largest number of prizes for works of art in the Salon of the Société des Artistes Français (the old Salon) has decided, on the report of MM. Dawant and Loviot, to admit examples of applied art and industry into the Champs Élysées Salon.—The members of the Institut have memorialised the Parliamentary Committee in charge of the Budget in favour of the award of a medal to the fine sculptural group by M. Falguère, which figures on the scene at the thousandth representation of "Faust," is to be permanently placed in the museum attached to the Opera-house.—The late M. Saintin, the

painter, has left to the École des Beaux-Arts a sum to found an annual prize for the student in painting who has received the largest number of prizes for work sent in during the year.—At a curiosity-shop a fine drawing by Ingres has been discovered, representing a singular scene.—The Société des Artistes Indépendants will open its annual exhibition in April next, in the Palais des Arts Libéraux.—M. Guillaume Dubufe is at present completing two allegorical ceiling-paintings and various decorative details for the new Salle à Manger constructed at the Palais de l'Élysée from the designs of M. Chancel.—It is announced that M. Mabius, the sculptor, whose works attracted great attention at the last Salon—especially the "L'Amour Piqué" which was purchased for the City of Paris, is very ill at the Hospital St. Antoine, and in great poverty.—The casts from the objects found at Delphi by the French School at Athens have been installed at the Louvre, in the old Assyrian Gallery. A large Hôtel de Ville is to be built at Levallois-Perret.—The jury of the competition opened by the Municipality of Paris for the construction of a new asylum at Ville d'Evrad, have awarded the premiums as follows:—1st premium, M. Morin-Goustiaux; 2nd, M. Duménil; 3rd, M. Lebeau; 4th, M. Dauvergne; 5th, M. de la Motte; 6th, M. Delaunay; 7th, M. Albisio; 8th, M. Bourdillat; 9th, MM. Marcel and Lafon.—The monument which the town of Fontainebleau is to raise on the Place de l'Hôtel de Ville, to the memory of President Carnot, is to consist of a bust on a pedestal surrounded by allegorical figures.—The jury for the competition of a monument to raise in Angoulême has awarded the first premium to M. Raoul Verlet. The design comprises a stele supporting a bust of Carnot, towards which a female figure extends a palm and an olive-branch.—The Municipal Council of Paris have authorised the erection, in the Parc Monceau, of a monument to Guy de Maupassant.—Important works are being completed. The Prefecture of the Seine have just completed. The Prefecture is now connected with the Palais de Justice by a large annex containing a very fine salle des fêtes in the Renaissance style.—At Royan the construction of a Municipal Casino will shortly be commenced from the designs of M. Redon, a former holder of the prix de Rome.—The Municipality of Blois has opened a competition for the construction of a large covered market in the Place Louis XII.—The death is announced of M. Bassac, city architect at Vanues; and also that of M. Jean Chéry-Laugée, an architectural "expert" adviser in Paris.

**FORTHCOMING SWEDISH EXHIBITIONS.**—It has now been decided that the Great Industrial and Art Exhibition to be held in Stockholm in 1897, to which we have previously referred, will be located in the so-called "Lion Plain." This plan brings the cost down to 2,056,281 kr. The area is 128,000 square metres. The receipts being estimated at 1,480,000 kr., a sum of 1,776,281 kr. will have to be found otherwise by the State, the city, &c. For the exhibition to be held next year in Malmö, Herr Wahlén, architect, has designed the locale. The main building is T-shaped, the frontage having a length of 123 metres, and the angle building a depth of 132 metres. The roof will be pointed, and have a height of 19 metres, the central portion being crowned with a tower and cupola 45 metres high. The area of the exhibition is estimated at 8,000 square metres, but 2,000 metres more can be added.

**IMPROVEMENTS IN TENERIFFE.**—According to a recent report of the British Consul at Tenerife, considerable improvements in this island have been commenced, and if the projects in contemplation are carried out, the unrivalled natural attractions of Tenerife will probably induce many invalids to remain here who have hitherto wintered in Grand Canary, solely on account of the superior hotel accommodation there. The "Pino de Oro" Hotel, within ten minutes' walk of Santa Cruz, commanding a magnificent view, possessing a beautiful garden, and being well out of range of the lower atmosphere, has been opened. Many new buildings with the latest sanitary arrangements are springing up in the suburbs, and waterworks, the electric light, and a refrigerating depot for Australian meat, are likely to be carried out. In Orotava the town and Grand Hotel are lighted by electricity, the motive power for the machinery—Twiss—being from cascades at the back of the town and said to be sufficiently powerful to light the whole island.

## MISCELLANEOUS.

**THE STANLEY-ANSLER PATENT COMPENSATING PLANIMETER.**—It is so often necessary to ascertain the area of a portion of ground shown on an Ordnance map or other place that a planimeter has become almost a necessity in the office of an architect or engineer. The best known form is that of J. Anslar-Laffon, the theory of which is so well explained in Minchin's "Uniplanar Kinematics." The instrument is composed of two rods hinged together. The extremity of one of the rods is fixed, and the free end of the other is able to trace out any form of curve, the length of which is only limited by the size of the instrument. As the free end is caused to trace out the boundary of the area

required, the revolutions of a graduated roller give a number proportional to the area that has been gone round. It will be seen at once that the accuracy of the apparatus depends on the area being exactly to scale, and should the map or plan have been mounted and shrunk, the readings would no longer give true results. To overcome this difficulty Mr. W. F. Stanley has devised a simple arrangement which insures correct results being obtained, notwithstanding any such shrinkage that might have taken place. A short portion of a continuous scale is placed on the instrument, which is made to read hundredths and sub-divisions of the length of the tracing-arm. Double the percentage of shrinkage of a plan or map gives the number of divisions of the scale engraved on the tracing-arm, to which it is to be set from zero. The planimeter adjusted in this way measures the true area on the shrunk map, if care be taken to follow the outline of the area to be computed with the tracing-point.

**CURRERS BUILDING SOCIETY.**—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its monthly meeting on Thursday last week, at the Society's house, 7, Dean's-yard, Westminster Abbey, the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, namely:—Rebuilding St. Michael's Church, Bugaldy, near Knighton, Radnor, 50*l.*; and towards enlarging or otherwise improving the accommodation in the churches at Barlby, near Selby, Yorks, 25*l.*; Canton St. Catherine, near Cardiff, 50*l.*; Orford St. Bartholomew, near Wickham Market, 80*l.*; Penderney St. Cynog, near Aberdare, 30*l.*; and Saxby St. Helen, near Lincoln, 5*l.* Grants were also made from the Mission Buildings Fund towards building mission churches at Devonport St. Chad, Devon, 20*l.*; and Henshall-with-Heck St. John the Baptist, near Snaith, Yorks, 30*l.* The following grants were also paid for works completed:—Ynsfeld, All Saints, near Pontypridd, 120*l.*, on account of a grant of 150*l.*; Gatehead St. Aidan, near Trimsby, Holy Trinity, 50*l.*; Wesham Church, near Colchester, 15*l.*, on account of a grant of 40*l.*; Wollaston St. Mary-the-Virgin, near Wellingborough, 15*l.*; Bonby St. Andrew, near Barton-on-Humber, 15*l.*; Marden All Saints, near Devizes, 25*l.*; Cogan Pill the Holy Nativity, near Penarth, Glamorgan, 100*l.*; Stoke-in-Teignmouth, near Exmouth, Devon, 100*l.*; Wesham Church, near Kirkham, Lancashire, 75*l.*; Allendale St. Peter, Northumberland, 25*l.*; Pontyberem St. John, near Llanelly, 200*l.*; and Plaietow St. Martin, Essex, 50*l.* The society likewise accepted the trust of 100*l.* as a repair fund for St. Nicholas Church, Grafton, near Marlborough, Wilts, and 60*l.* for St. Andrew's Church, Dorchester, Dorset, the year grants amounting to 3,965*l.* have been made towards building seventeen new churches, thirteen of which are entirely free and unappropriated, rebuilding seven, and the restoration and improvement of forty-five existing churches. The carrying out of these works has called from the public the sum of 186,126*l.* The total amount has been voted towards twenty-one mission buildings, and 4,865*l.* has been paid for works completed.

**COMMISSION OF SEWERS.**—Mr. Alderman Bell (the Chairman) presided at a meeting of the Commission of Sewers on the 18th inst., at the Guildhall. The members of the Common Council for Farringdon Without, and the inhabitants of Tudor-street and its neighbourhood, presented a petition praying for the placing of a noiseless pavement in the said street, Talis-street, Bouvier-street, and Temple-street. On the motion of Mr. Alderman Treloar, seconded by Mr. Turner, and supported by Mr. Pearce Morrison and Mr. Morton, the petition was referred to the Streets Committee. The Court then read a report from the Finance and Improvement Committee, relative to the communication from the London County Council as to the widening of Thames-street, and forming a northern approach to Tower Bridge. The committee recommended that it be intimated in reply that the Commission would be prepared to enter into the arrangements suggested by the Improvements Committee of the London County Council—viz., to carry out the City portion of the said approach to Tower Bridge (estimated to cost 63,050*l.*), the London County Council paying half the cost, and paying also one-third of the cost of the said improvement in Thames-street (estimated to cost 37,500*l.*). Mr. Wallace, in moving the adoption of the report, said the offer of the Improvements Committee of the London County Council really meant that, instead of the new body carrying out the old acknowledged policy of the payment of half of the cost of such improvements, there would be a loss so far as the City was concerned of about 20,000*l.* It remained with the Court to adopt the report or to reject it, and he wished to remind his colleagues that the northern approach in question was an improvement which was more of a metropolitan character than of a civic nature. The Chairman then put the motion for the adoption of the report, and it was agreed to.

**TRADES TRAINING SCHOOL.**—On the 20th inst. the certificates gained at the Carpenter's company's recent examination in sanitary building construction, and the prizes to the successful students at the company's organised science schools and workshops at Stratford, were distributed in the



THE CRYSTAL PALACE SCHOOL OF PRACTICAL ENGINEERING.—The annual distribution of certificates to the students of this school took place on the 21st inst. in the school buildings near the southern tower of the Crystal Palace. Mr. J. H. Greathead, of the Palace, Mr. R. G. Hodson, Superintendent of the Palace School of Art, Science, and Literature read the examination results, which showed that the students now number 200. The chairman, in the course of an address to the pupils, said that it was upon the choice they had made of a profession, and said that the occupation of engineering was one in which above all others useful work could be done by those who really had a taste for it. Students in these days had opportunities of attaining proficiency in their work when he became an engineer. "It was a most useful and profitable occupation," he said, "going into an engineer's office to a young man before going into practical work. Every engineer who presented himself to him had to show that he had spent some time had to be capable of doing a good amount of work, and must master a great many branches of knowledge. There were great opportunities for engineers who had fitted themselves for undertaking really serious work, and his advice to all those who were going upon an engineering career was to fit themselves for it by doing any work that might come in their way at a later stage. He said that the road to success, which must, in engineering, always depend upon the perfection of details. The certificates having been distributed by the Chairman, Mr. G. T. Rait, on behalf of the Crystal Palace





This Asphalte was chosen to be laid at Sandringham, on the new General Post Office, and other important buildings.

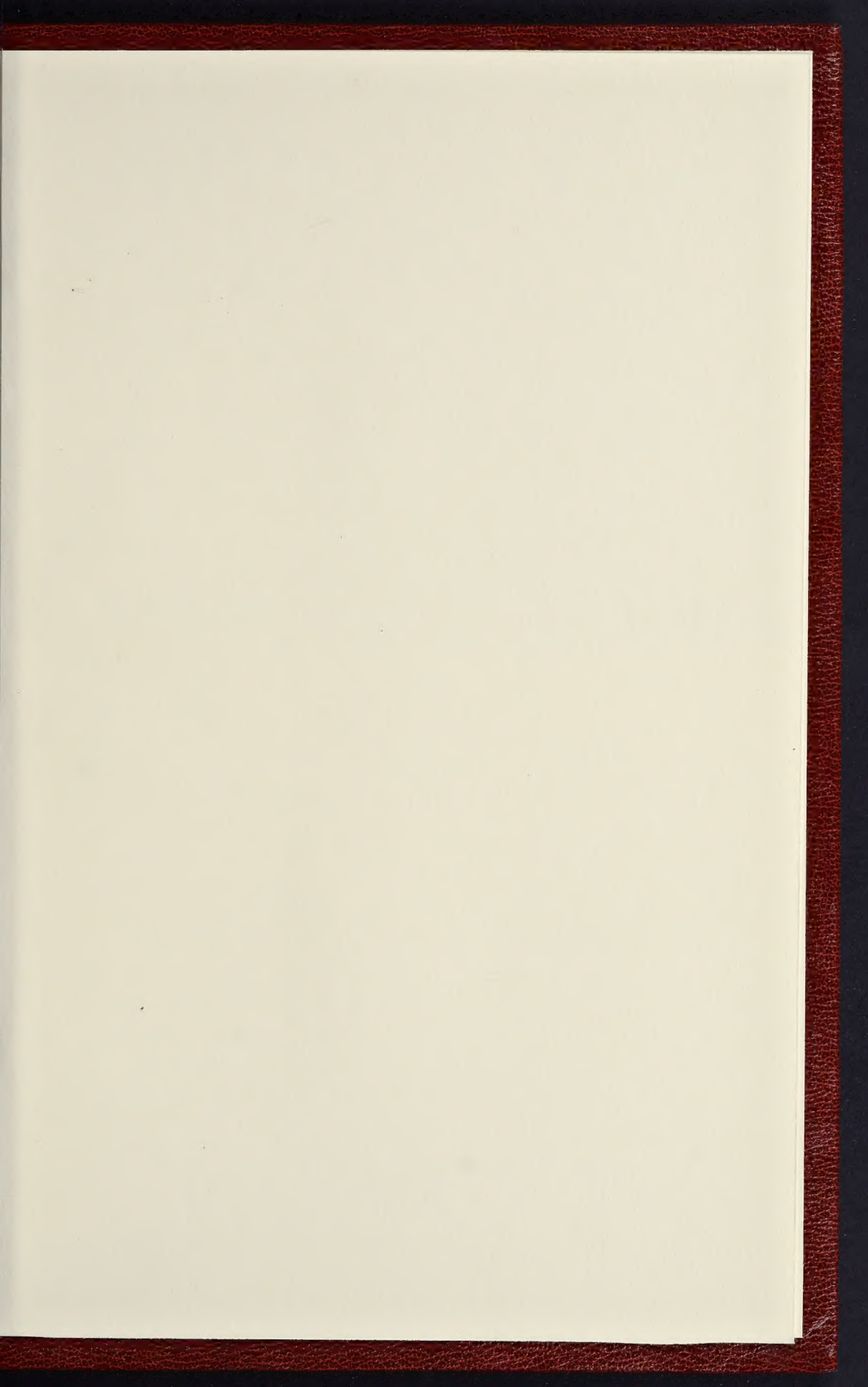
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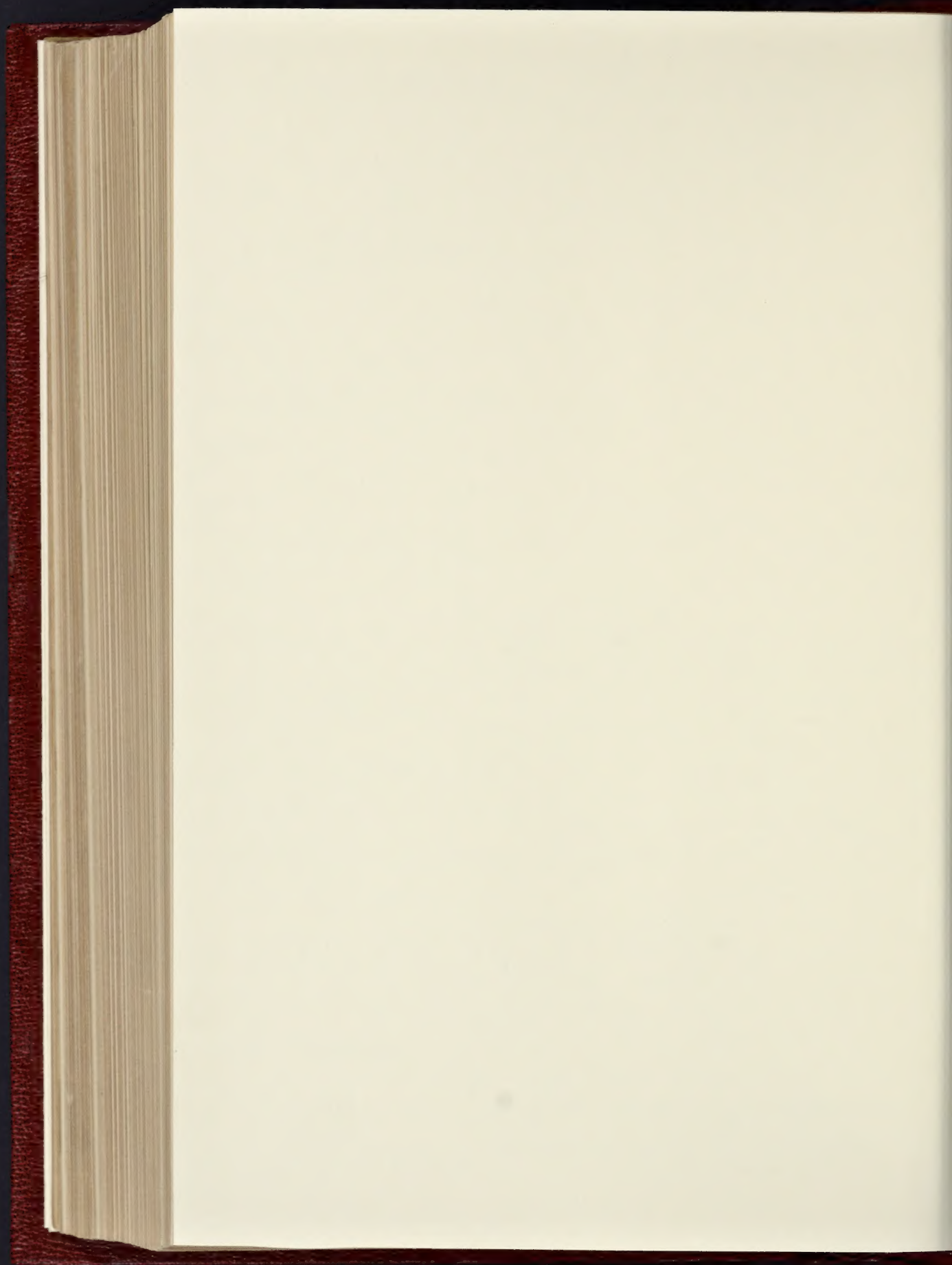
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